

PAM 550.341

LAMONT GEOLOGICAL OBSERVATORY  
COLUMBIA UNIVERSITY

PALISADES, NEW YORK

SEISMOLOGICAL BULLETIN

By

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L.G.O. Contribution No. 502

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1607

POLARPAM

## STATION CONSTANTS

Latitude: 41° 00' 25" North  
Longitude: 73° 54' 31" West  
Elevation: 102.59 meters  
Bedrock: Palisades diabase Triassic Age

### Abbreviations

i = sudden beginning of the motion (impetus)  
e = gradual beginning of the motion (emersio)  
Lg = short period continental surface shear wave  
Rg = continental Rayleigh wave  
Comp. = compression  
Dil. = dilatation

All times are G. C. T.

Time - I. B. M. Invar pendulum clock corrected by Naval Observatory time signals every six hours.

## METHOD OF COMPUTING MAGNITUDES AT PALISADES

Magnitudes at Palisades are computed from Gutenberg's<sup>1</sup> formula:

$$M \text{ (magnitude)} = \log A - \log B + C + D$$

where

A = the maximum amplitude in microns for surface waves with periods of about 20 seconds. If the horizontal ground motion is used, A is obtained from the square root of the sum of the squares of the maximum ground amplitudes on the E-W and the N-S recordings.

In the rare cases where horizontal component instruments are not available, the vertical component alone is used. In general, records from the wide-band, long-period instruments with pendulum periods of 30 seconds and galvanometer periods of 100 seconds are used. In special cases where instruments of  $T_0 = 15$  sec,  $T_g = 75$  sec are used, the readings are preceded by an asterisk.

$-\log B$  is determined from tables by Gutenberg of  $-\log B$  for varying epicentral distances.

C and D are presently taken as 0 for Palisades. C is a station constant, D depends on depth of focus, radiation pattern, absorption, and irregularities.

At present magnitudes are computed only for shallow shocks.

1. Gutenberg, B. Amplitudes of surface waves and magnitudes of shallow earthquakes. Bulletin of Seismological Society of America, Vol. 35, No. 1, January 1945.

## Instruments

Three component Columbia University seismographs.  
To = 12 sec., Tg = 15 sec.

Three component Benioff seismographs. Short-period, To = 1 sec.,  
Tg = 0.2 sec. Long-period, To = 1 sec., Tg = 75 sec.

One Columbia University vertical seismograph. To = .33 sec.,  
Tg = 0.2 sec.

Three component Columbia University visual recording seismographs,  
To = 12 sec.

One Columbia University vertical seismograph for visual recording,  
To = 1 sec.

Three component Columbia University long-period seismographs,  
To = 15 sec., Tg = 75 sec.

Three component Columbia University long-period seismographs,  
To = 30 sec., Tg = 100 sec.

Three component Columbia University long-period seismographs, (1)  
To = 30 sec., Tg = 100 sec. P<sub>2</sub> to 20 September, 1960.

Z component To = 30 sec., Tg = 100 sec. P<sub>2</sub> from 20 September,  
1960 to 31 December, 1960.

Three component Columbia University long-period seismographs, (2)  
To = 30 sec., Tg = 100 sec. P<sub>2F</sub> from 20 September, 1960 to  
31 December, 1960.

Two Columbia University microbarographs, To = 10 sec., Tg = 75 sec.

(1) Seismographs of High Magnification at Long Periods. G. Sutton  
and J. Oliver. Annales de Geophysique, Tome 15, No. 4, 1959,  
p. 423-433.

(2) The Use of Galvanometers as Band-rejection Filters in Electro-  
magnetic Seismographs. P. W. Pomeroy and G.H. Sutton.  
Seism. Soc. Amer. Bull., v. 50, p. 135-151.





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| Date   | Phase                        | h  | m  | s  | Date   | Phase                       | h  | m  | s  |
|--------|------------------------------|----|----|----|--------|-----------------------------|----|----|----|
| Jan. 1 | eLR                          | 21 | 51 | 06 | Jan. 3 | e                           | 12 | 23 | 36 |
|        |                              |    |    |    |        | eLR                         | 12 | 34 | 06 |
| 2      | eS                           | 03 | 39 | 36 |        | Banda Sea                   |    |    |    |
|        | eSS                          | 03 | 45 | 16 |        |                             |    |    |    |
|        | eLQ                          | 03 | 51 | 06 | 3      | eLR                         | 18 | 40 | 06 |
|        | eLR                          | 03 | 56 | 06 |        | New Britain                 |    |    |    |
|        | Off coast Chile              |    |    |    |        |                             |    |    |    |
|        | USCGS 03 16 41.0             |    |    |    | 5      | iP                          | 14 | 17 | 12 |
|        | 41.4°S 88.8°W Dist. 82.7°    |    |    |    |        | P (Z) 9 sec 5 mic comp NW   |    |    |    |
|        | Depth 25 km                  |    |    |    |        | epP                         | 14 | 17 | 15 |
|        |                              |    |    |    |        | ePP                         | 14 | 19 | 34 |
| 2      | eP                           | 10 | 27 | 06 |        | ePPP                        | 14 | 21 | 10 |
|        | ePKP                         | 10 | 30 | 34 |        | iS                          | 14 | 25 | 50 |
|        | ePP                          | 10 | 31 | 58 |        | ePS                         | 14 | 26 | 22 |
|        | eSKKKS                       | 10 | 39 | 56 |        | ePPS                        | 14 | 26 | 54 |
|        | eScSP                        | 10 | 41 | 42 |        | eScS                        | 14 | 27 | 06 |
|        | ePS                          | 10 | 42 | 18 |        | eSS                         | 14 | 30 | 24 |
|        | ePKKS                        | 10 | 44 | 38 |        | eLQ                         | 14 | 35 | 46 |
|        | eSS                          | 10 | 48 | 18 |        | eLR (NW)                    | 14 | 39 | 06 |
|        | eSKKKS                       | 10 | 51 | 36 |        | Aleutian Islands            |    |    |    |
|        | eLQ                          | 11 | 01 | 46 |        | USCGS 14 06 25.8            |    |    |    |
|        | eLR (WNW)                    | 11 | 08 | 06 |        | 51.6°N 176.3°W Dist. 65.4°  |    |    |    |
|        | eLQ <sup>2</sup>             | 12 | 02 | 06 |        | Depth 37 km Mag 6 1/4-6 1/2 |    |    |    |
|        | eLR <sup>2</sup>             | 12 | 04 | 46 |        | Z 35, E 40, N 45*           |    |    |    |
|        | Santa Cruz Islands           |    |    |    |        |                             |    |    |    |
|        | USCGS 10 11 56.9             |    |    |    | 5      | ePKP                        | 16 | 12 | 58 |
|        | 12.4°S 166.4°E Dist. 120.4°  |    |    |    |        | epPKP                       | 16 | 13 | 37 |
|        | Depth 161 km Mag 6 1/4-6 1/2 |    |    |    |        | ePKS <sub>1</sub>           | 16 | 16 | 09 |
|        | Z 16, E 21, N 14             |    |    |    |        | ePKS <sub>2</sub>           | 16 | 16 | 13 |
|        |                              |    |    |    |        | e (pPKS)                    | 16 | 16 | 21 |
| 2      | eLQ                          | 21 | 46 | 06 |        | ePPP                        | 16 | 17 | 13 |
|        | eLR                          | 21 | 54 | 06 |        | ePS                         | 16 | 25 | 49 |
|        | New Britain region           |    |    |    |        | e (ScSPKP)                  | 16 | 28 | 33 |
|        |                              |    |    |    |        | eSS                         | 16 | 33 | 05 |
| 3      | eLR (NW)                     | 00 | 09 | 26 |        | eLQ                         | 16 | 48 | 05 |
|        | Solomon Islands              |    |    |    |        | eLR (NW)                    | 16 | 54 | 25 |
|        |                              |    |    |    |        | New Guinea                  |    |    |    |
| 3      | eLR                          | 01 | 43 | 36 |        | USCGS 15 53 56.0            |    |    |    |
|        |                              |    |    |    |        | 4.1°S 143.0°E Dist. 130.4°  |    |    |    |
| 3      | eLQ                          | 06 | 59 | 16 |        | Depth 108 km Mag 6          |    |    |    |
|        | eLR (S)                      | 07 | 04 | 06 |        | Z 8, E 7, N 10              |    |    |    |
|        |                              |    |    |    |        |                             |    |    |    |
| 3      | eS                           | 08 | 28 | 26 | 5      | ePKP                        | 18 | 16 | 44 |
|        | eLQ                          | 08 | 34 | 26 |        | ePP                         | 18 | 18 | 29 |
|        | eLR (SE)                     | 08 | 36 | 36 |        | ePKS                        | 18 | 19 | 57 |
|        | Mid-Atlantic Ocean           |    |    |    |        | eSKS                        | 18 | 23 | 45 |
|        | USCGS 08 10 40.4             |    |    |    |        | eSKKS                       | 18 | 25 | 25 |
|        | 1.1°N 29.2°W Dist. 56.8°     |    |    |    |        | ePKKP                       | 18 | 27 | 25 |
|        | Depth 25 km                  |    |    |    |        | ePS                         | 18 | 28 | 25 |
|        |                              |    |    |    |        | ePPS                        | 18 | 29 | 57 |
| 3      | eLQ                          | 08 | 58 | 36 |        | eSS                         | 18 | 35 | 25 |
|        | eLR                          | 09 | 05 | 46 |        | eLQ                         | 18 | 49 | 45 |
|        |                              |    |    |    |        | eLR (NW)                    | 18 | 56 | 35 |

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| Date   | Phase   | h            | m  | s  | Date   | Phase                | h            | m  | s  |
|--------|---|--------------|----|----|--------|----------------------|--------------|----|----|
| Jan. 5 | Loyalty Islands<br>USCGS 17 57 56.6<br>21.2°S 169.3°E<br>Depth 123 km<br>Z 27, E 30, N 23 |              |    |    | Jan. 7 | eLR                  | 07           | 50 | 05 |
|        |   |              |    |    | 7      | ePP                  | 18           | 35 | 37 |
|        |   |              |    |    |        | ePS                  | 18           | 44 | 45 |
|        |   |              |    |    |        | eSS                  | 18           | 50 | 25 |
|        |   |              |    |    |        | eLQ                  | 19           | 00 | 05 |
| 5      | ePKP  | 18           | 33 | 31 |        | eLR (SSE)            | 19           | 06 | 05 |
|        | e (SKS)   | 18           | 39 | 35 |        | Sandwich Islands     |              |    |    |
|        | ePKKS   | 18           | 46 | 45 |        | USCGS 18 16 51.2     |              |    |    |
|        | eSS   | 18           | 50 | 17 |        | 57.2°S 25.3°W        | Dist. 105.9° |    |    |
|        | eSKKS   | 18           | 52 | 35 |        | Depth 94 km          | Mag 5 1/2    |    |    |
|        | eSSS  | 18           | 59 | 05 |        | Z 1, E 2, N 2        |              |    |    |
|        | eLR (NW)  | 19           | 13 | 05 |        |                      |              |    |    |
|        | Loyalty Islands   |              |    |    | 8      | e                    | 03           | 35 | 25 |
|        | USCGS 18 14 43.0  |              |    |    |        | eLQ                  | 03           | 53 | 05 |
|        | 21.0°S 169.1°E  | Dist. 123.6° |    |    |        | eLR (SE)             | 04           | 00 | 05 |
|        | Depth 124 km  |              |    |    |        |                      |              |    |    |
| 5      | e   | 19           | 17 | 37 | 8      | eLR (SW)             | 08           | 35 | 05 |
|        | eLR (SE)  | 20           | 01 | 35 | 8      | eLR                  | 21           | 12 | 05 |
| 6      | eLR   | 00           | 19 | 05 | 8      | eLR                  | 22           | 02 | 05 |
| 6      | eLR   | 00           | 57 | 05 | 9      | eLR (SW)             | 00           | 09 | 25 |
|        | Kermadec Islands  |              |    |    |        |                      |              |    |    |
| 6      | eLR (W)   | 01           | 32 | 05 | 9      | eLR (SE)             | 03           | 21 | 45 |
|        |   |              |    |    |        | North Atlantic Ocean |              |    |    |
| 6      | eLQ   | 02           | 02 | 05 |        | USCGS 03 08 37.7     |              |    |    |
|        | eLR   | 02           | 04 | 05 |        | 31.2°N 41.0°W        | Dist. 28.2°  |    |    |
|        | Hokkaido, Japan   |              |    |    |        | Depth 49 km          | Mag 4 3/4    |    |    |
|        |   |              |    |    |        | Z 5, E 7, N 3        |              |    |    |
| 6      | eLR   | 05           | 52 | 05 | 9      | eLR                  | 04           | 11 | 05 |
| 6      | eLQ   | 06           | 51 | 05 | 9      | eLR                  | 04           | 41 | 15 |
|        | eLR   | 06           | 55 | 35 |        |                      |              |    |    |
|        | Aleutian Islands  |              |    |    | 9      | eLR                  | 06           | 22 | 05 |
| 6      | eLR   | 07           | 52 | 05 | 9      | eLR (SW)             | 08           | 56 | 05 |
|        | Kamchatka   |              |    |    |        | Kermadec             |              |    |    |
| 6      | eLR (E)   | 08           | 56 | 35 | 9      | eLR (SW)             | 11           | 15 | 05 |
|        |   |              |    |    |        | Z 2, E 3, N 2.5      |              |    |    |
| 6      | eLR   | 10           | 21 | 05 |        |                      |              |    |    |
| 6      | eLR   | 11           | 04 | 05 | 9      | eP                   | 19           | 27 | 49 |
|        | South coast Mexico  |              |    |    |        | eS                   | 19           | 32 | 05 |
|        |   |              |    |    |        | eLQ                  | 19           | 33 | 05 |
|        |   |              |    |    |        | eLR (SE)             | 19           | 34 | 05 |
| 6      | eLR   | 11           | 42 | 25 |        | Leward Islands       |              |    |    |
|        |   |              |    |    |        | USCGS 19 22 05.6     |              |    |    |
| 6      | eLR   | 13           | 35 | 05 |        | 17.8°N 61.0°W        | Dist. 25.4°  |    |    |
| 6      | eLR   | 17           | 03 | 05 |        | Depth 31 km          | Mag 4 1/2    |    |    |
|        |   |              |    |    |        | Z 2.0, E 3.5, N 3.0  |              |    |    |

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| Date   | Phase                        | h  | m  | s  | Date    | Phase                          | h  | m  | s  |
|--------|------------------------------|----|----|----|---------|--------------------------------|----|----|----|
| Jan. 9 | eLR<br>Outer Mongolia        | 23 | 00 | 25 | Jan. 14 | eLR (W)                        | 01 | 48 | 03 |
| 10     | eLR                          | 03 | 15 | 05 | 14      | eLQ                            | 02 | 56 | 03 |
| 10     | eLR                          | 05 | 20 | 05 |         | eLR (NW)<br>Aleutian Islands   | 03 | 04 | 03 |
| 10     | iP                           | 14 | 34 | 24 | 14      | eLR (NW)<br>New Ireland region | 06 | 34 | 03 |
|        | P (Z) 10 sec 3.5 mic comp NW |    |    |    |         |                                |    |    |    |
|        | epP                          | 14 | 34 | 37 | 14      | eP                             | 16 | 48 | 47 |
|        | ePP                          | 14 | 37 | 25 |         | eS                             | 16 | 56 | 47 |
|        | ePPP                         | 14 | 39 | 37 |         | ePS                            | 16 | 57 | 03 |
|        | eS                           | 14 | 44 | 19 |         | ePPS                           | 16 | 57 | 23 |
|        | ePPS                         | 14 | 44 | 55 |         | eScS                           | 16 | 58 | 19 |
|        | eSS                          | 14 | 49 | 31 |         | eSS                            | 17 | 00 | 39 |
|        | eSSS                         | 14 | 53 | 53 |         | eSSS                           | 17 | 03 | 19 |
|        | eLQ                          | 14 | 56 | 05 |         | eLQ                            | 17 | 04 | 03 |
|        | eLR (NW)                     | 15 | 00 | 25 |         | eLR (NW)                       | 17 | 06 | 23 |
|        | Kurile Islands               |    |    |    |         | Unimak Island region           |    |    |    |
|        | USCGS 14 22 18.2             |    |    |    |         | USCGS 16 38 55.6               |    |    |    |
|        | 49.9°N 156.2°E Dist. 79.3°   |    |    |    |         | 53.9°N 163.7°W Dist. 58.2°     |    |    |    |
|        | Depth 29 km Mag 6 1/4-6 1/2  |    |    |    |         | Depth 41 km Mag 5 3/4          |    |    |    |
|        | Z 22.5, E 45, N 40           |    |    |    |         | Z 9.5, E 13, N 14.5            |    |    |    |
| 11     | eP                           | 12 | 10 | 21 | 14      | e                              | 20 | 19 | 13 |
|        | epP                          | 12 | 10 | 34 |         | e                              | 20 | 19 | 35 |
|        | ePcP                         | 12 | 11 | 20 |         |                                |    |    |    |
|        | eS                           | 12 | 18 | 48 | 15      | eLQ                            | 02 | 06 | 33 |
|        | eScS                         | 12 | 20 | 26 |         | eLR (SW)                       | 02 | 15 | 33 |
|        | eSS                          | 12 | 23 | 04 |         |                                |    |    |    |
|        | eLQ                          | 12 | 25 | 54 | 15      | eLR                            | 05 | 05 | 03 |
|        | eLR (NW)                     | 12 | 27 | 56 |         |                                |    |    |    |
|        | Fox Islands, Aleutians       |    |    |    | 15      | eS                             | 06 | 06 | 03 |
|        | USCGS 11 59 55.0             |    |    |    |         | eLR (E)                        | 06 | 09 | 03 |
|        | 51.8°N 171.0°W Dist. 62.8°   |    |    |    |         | Leeward Islands                |    |    |    |
|        | Depth 47 km Mag 5 3/4-6      |    |    |    |         | USCGS 05 56 15.1               |    |    |    |
|        | Z 18, E 28, N 30             |    |    |    |         | 17.4°N 61.2°W Dist. 26.4°      |    |    |    |
|        |                              |    |    |    |         | Dept. 60 km                    |    |    |    |
| 11     | eLQ                          | 22 | 36 | 04 |         |                                |    |    |    |
|        | eLR                          | 22 | 44 | 34 | 15      | eLR                            | 11 | 26 | 03 |
|        | MacQuarie Islands            |    |    |    |         |                                |    |    |    |
| 12     | eLR                          | 06 | 19 | 24 | 15      | eLR                            | 12 | 52 | 03 |
|        | New Hebrides                 |    |    |    |         | Japan                          |    |    |    |
| 12     | eLQ                          | 19 | 51 | 24 | 15      | eLR                            | 17 | 05 | 51 |
|        | eLR (SW)                     | 19 | 55 | 04 | 15      | ePKKP                          | 17 | 13 | 03 |
| 13     | e                            | 19 | 57 | 23 |         | e (PS)                         | 17 | 15 | 43 |
|        | e                            | 20 | 02 | 11 |         | e PPS                          | 17 | 16 | 39 |
|        | eLQ                          | 20 | 11 | 03 |         | ePKKS                          | 17 | 17 | 03 |
|        | eLR                          | 20 | 15 | 03 |         | eScSPKP                        | 17 | 18 | 13 |
|        |                              |    |    |    |         | eSS                            | 17 | 21 | 57 |



| Date     | Phase                  | h  | m  | s  | Date     | Phase               | h  | m  | s                 |
|----------|------------------------|----|----|----|----------|---------------------|----|----|-------------------|
| Jan. 15  | e (SKPPKP)             | 17 | 23 | 43 | Jan. 16  | Honshu, Japan       |    |    |                   |
| (cont'd) | eSSS                   | 17 | 25 | 47 | (cont'd) | USCGS 12 12 34.4    |    |    |                   |
|          | eSSSS                  | 17 | 28 | 55 |          | 36.2°N 141.7°E      |    |    | Dist. 96.5°       |
|          | eLQ                    | 17 | 36 | 27 |          | Depth 105 km        |    |    | Mag 6 1/4 - 6 1/2 |
|          | eLR (NNW)              | 17 | 42 | 03 |          | Z 23, E 30, N 25    |    |    |                   |
|          | Loyalty Islands region |    |    |    |          |                     |    |    |                   |
|          | USCGS 16 44 44.8       |    |    |    | 16       | eLQ                 | 14 | 48 | 23                |
|          | 20.4°S 169.5°E         |    |    |    |          | eLR                 | 14 | 54 | 03                |
|          | Dist. 122.3°           |    |    |    |          | Honshu, Japan       |    |    |                   |
|          | Depth 182 km           |    |    |    |          |                     |    |    |                   |
| 16       | eS                     | 04 | 10 | 43 | 16       | eSKS                | 16 | 05 | 55                |
|          | eLQ                    | 04 | 13 | 43 |          | eSKKS               | 16 | 06 | 19                |
|          | eLR (SW)               | 04 | 17 | 03 |          | ePS                 | 16 | 07 | 21                |
|          | Near coast Mexico      |    |    |    |          | eSS                 | 16 | 12 | 31                |
|          | USCGS 03 58 52.5       |    |    |    |          | eSSS                | 16 | 18 | 23                |
|          | 18.2°N 102.4°W         |    |    |    |          | eLQ                 | 16 | 21 | 43                |
|          | Dist. 33.2°            |    |    |    |          | eLR (N)             | 16 | 27 | 03                |
|          | Depth 153 km           |    |    |    |          | Honshu, Japan       |    |    |                   |
| 16       | eP                     | 07 | 33 | 37 |          | USCGS 15 41 23.3    |    |    |                   |
|          | ePP                    | 07 | 37 | 37 |          | 36.4°N 140.6°E      |    |    | Dist. 96.9°       |
|          | ePPP                   | 07 | 40 | 11 |          | Depth 147 km        |    |    | Mag 6 - 6 1/4     |
|          | ePKS                   | 07 | 42 | 17 |          | Z 10, E 28, N15     |    |    |                   |
|          | eSKS                   | 07 | 44 | 55 |          |                     |    |    |                   |
|          | eSKKS                  | 07 | 45 | 15 | 17       | eLQ                 | 02 | 37 | 23                |
|          | ePS                    | 07 | 46 | 29 |          | eLR                 | 02 | 44 | 03                |
|          | eSS                    | 07 | 51 | 43 |          |                     |    |    |                   |
|          | eLQ                    | 07 | 59 | 03 | 17       | eLQ                 | 08 | 56 | 03                |
|          | eLR (N)                | 08 | 05 | 03 |          | eLR                 | 09 | 00 | 03                |
|          | Honshu, Japan          |    |    |    |          |                     |    |    |                   |
|          | USCGS 07 20 18.6       |    |    |    | 17       | eLR                 | 14 | 27 | 03                |
|          | 36.0°N 141.1°E         |    |    |    |          |                     |    |    |                   |
|          | Dist. 96.9°            |    |    |    | 17       | e                   | 18 | 36 | 42                |
|          | Depth 131 km           |    |    |    |          | eLQ                 | 18 | 55 | 22                |
|          | Mag 6 1/2-6 3/4        |    |    |    |          | eLR (W)             | 19 | 02 | 02                |
|          | Z 32, E 60, N 50       |    |    |    |          |                     |    |    |                   |
| 16       | eSKKS                  | 11 | 44 | 33 |          |                     |    |    |                   |
|          | eLQ                    | 12 | 01 | 03 | 17       | ePP                 | 23 | 26 | 18                |
|          | eLR (N)                | 12 | 05 | 03 |          | ePS                 | 23 | 35 | 54                |
|          | Honshu, Japan          |    |    |    |          | ePPS                | 23 | 37 | 52                |
|          | USCGS 11 19 46.5       |    |    |    |          | eSS                 | 23 | 43 | 02                |
|          | 35.7°N 140.6°E         |    |    |    |          | e                   | 23 | 47 | 02                |
|          | Dist. 96.9°            |    |    |    |          | eLQ                 | 23 | 55 | 18                |
|          | Depth 157 km           |    |    |    |          | eLR (NW)            | 23 | 59 | 22                |
| 16       | eSKS                   | 12 | 37 | 15 |          | Loyalty Islands     |    |    |                   |
|          | ePS                    | 12 | 38 | 41 |          | USCGS 23 05 32.5    |    |    |                   |
|          | eSS                    | 12 | 44 | 03 |          | 21.4°S 169.3°E      |    |    | Dist. 123.7°      |
|          | eSSS                   | 12 | 49 | 35 |          | Depth 84 km         |    |    | Mag 5 1/2         |
|          | eLQ                    | 12 | 53 | 03 |          | Z 2.5, E 3.5, N 2.0 |    |    |                   |
|          | eLR (N)                | 12 | 58 | 03 |          |                     |    |    |                   |
|          | (continued)            |    |    |    | 18       | e (L)               | 08 | 05 | 02                |
|          |                        |    |    |    |          | Honshu, Japan       |    |    |                   |



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| Date    | Phase                       | h  | m  | s  | Date     | Phase                     | h  | m  | s            |
|---------|-----------------------------|----|----|----|----------|---------------------------|----|----|--------------|
| Jan. 18 | eLQ                         | 08 | 21 | 52 | Jan. 20  | eLQ                       | 02 | 08 | 32           |
|         | eLR                         | 08 | 28 | 02 | (cont'd) | eLR (W)                   | 02 | 10 | 22           |
|         | Honshu, Japan               |    |    |    |          | Off coast Mexico          |    |    |              |
| 18      | eLR (NW)                    | 10 | 07 | 02 |          | USCGS 01 51 56.6          |    |    |              |
|         | New Hebrides                |    |    |    |          | 20.3°N 108.6°W            |    |    | Dist. 36.4°  |
| 18      | eLQ                         | 16 | 04 | 22 |          | Depth 84 km               |    |    | Mag 4 3/4    |
|         | eLR (W)                     | 16 | 07 | 02 |          | Z 2.5, E 2.5, N 5.0       |    |    |              |
|         | Tonga Islands               |    |    |    | 20       | eLR                       | 05 | 51 | 32           |
| 18      | eLQ                         | 21 | 42 | 12 |          | Kodiak, Alaska            |    |    |              |
|         | eLR (W)                     | 21 | 45 | 02 | 20       | eLR                       | 08 | 39 | 02           |
| 19      | ePS                         | 04 | 51 | 30 |          |                           |    |    |              |
|         | eSS                         | 04 | 59 | 02 | 20       | eLR                       | 14 | 01 | 42           |
|         | eSKKS                       | 05 | 02 | 42 |          | Kodiak Islands, Alaska    |    |    |              |
|         | eSSS                        | 05 | 07 | 38 | 20       | eP                        | 17 | 18 | 30           |
|         | eLQ                         | 05 | 12 | 22 |          | eS                        | 17 | 25 | 38           |
|         | eLR (NW)                    | 05 | 18 | 32 |          | eSS                       | 17 | 29 | 34           |
|         | New Hebrides Islands region |    |    |    |          | eLQ                       | 17 | 32 | 32           |
|         | USCGS 04 21 16.0            |    |    |    |          | eLR                       | 17 | 36 | 32           |
|         | 14.4°S 166.7°E              |    |    |    |          | Kodiak, Alaska            |    |    |              |
|         | Depth 26 km                 |    |    |    |          | USCGS 17 09 15.7          |    |    |              |
|         | Z 2.0, E 3.5, N 2.5         |    |    |    |          | 56.4°N 152.3°W            |    |    | Dist. 51°    |
| 19      | eLQ                         | 06 | 45 | 22 |          | Depth 46 km               |    |    | Mag 6 3/4    |
|         | eLR (NW)                    | 06 | 52 | 02 | 20       | eLR                       | 21 | 58 | 02           |
|         | Loyalty Islands             |    |    |    |          | Kodiak, Alaska            |    |    |              |
| 19      | eLR                         | 07 | 58 | 02 | 21       | eLR                       | 22 | 20 | 32           |
| 19      | eP                          | 17 | 34 | 22 |          |                           |    |    |              |
|         | eS                          | 17 | 44 | 16 | 22       | e (P)                     | 03 | 39 | 30           |
|         | ePS                         | 17 | 44 | 42 |          | ePP                       | 03 | 44 | 18           |
|         | eSS                         | 17 | 50 | 22 |          | ePPP                      | 03 | 47 | 02           |
|         | eSSS                        | 17 | 54 | 10 |          | eSKS                      | 03 | 50 | 06           |
|         | eLQ                         | 17 | 56 | 02 |          | ePS                       | 03 | 54 | 18           |
|         | eLR (NW)                    | 18 | 01 | 02 |          | ePPS                      | 03 | 56 | 02           |
|         | Kurile Islands              |    |    |    |          | eSS                       | 04 | 00 | 42           |
|         | USCGS 17 22 16.9            |    |    |    |          | eSSS                      | 04 | 05 | 02           |
|         | 49.7°N 155.8°E              |    |    |    |          | eLQ                       | 04 | 14 | 02           |
|         | Depth 31 km                 |    |    |    |          | eLR (NW)                  | 04 | 20 | 02           |
|         | Mag 5 1/4-5 1/2             |    |    |    |          | eLR <sub>2</sub> (SE)     | 05 | 16 | 32           |
|         | Z 2.5, E 4.0, N 3.5         |    |    |    |          | Santa Cruz Islands region |    |    |              |
| 19      | eLR                         | 21 | 23 | 02 |          | USCGS 03 24 04.5          |    |    |              |
| 20      | eLR                         | 01 | 25 | 02 |          | 11.9°S 166.2°E            |    |    | Dist. 120.4° |
|         | Kodiak, Alaska              |    |    |    |          | Depth 25 km               |    |    | Mag 7 1/4    |
| 20      | eS                          | 02 | 04 | 18 |          | Z 72, E 105, N 75         |    |    |              |
|         | ePcS                        | 02 | 05 | 02 | 22       | eLR                       | 13 | 52 | 02           |
|         | eSS                         | 02 | 07 | 12 | 22       | eLR                       | 14 | 39 | 02           |

| Date     | Phase                      | h  | m  | s           | Date     | Phase                    | h  | m  | s           |
|----------|----------------------------|----|----|-------------|----------|--------------------------|----|----|-------------|
| Jan. 30  | Central Alaska             |    |    |             | Feb. 1   | Depth 42 km              |    |    |             |
| (cont'd) | USCGS 12 12 39.7           |    |    |             | (cont'd) | Z 6, E 14.5, N 17.5      |    |    | Mag 5 1/2   |
|          | 65.2°N 149.9°W             |    |    | Dist. 48.°  |          |                          |    |    |             |
|          | Depth 34 km                |    |    | Mag 5 1/2   | 1        | eLQ                      | 05 | 47 | 04          |
|          | Z 5.5, E 11, N 14          |    |    |             |          | eLR (NW)                 | 05 | 54 | 04          |
|          |                            |    |    |             |          | Marianas                 |    |    |             |
| 31       | eP                         | 00 | 57 | 50          |          | Z 1.5, E 2.0, N 1.5      |    |    |             |
|          | ePcP                       | 00 | 58 | 36          |          |                          |    |    |             |
|          | ePP                        | 00 | 59 | 54          | 1        | eLR                      | 07 | 26 | 24          |
|          | ePPP                       | 01 | 01 | 18          |          | New Hebrides             |    |    |             |
|          | e                          | 01 | 04 | 22          |          |                          |    |    |             |
|          | eS                         | 01 | 05 | 08          | 1        | eLQ                      | 08 | 05 | 04          |
|          | eScS                       | 01 | 07 | 36          |          | eLR (NW)                 | 08 | 08 | 24          |
|          | eSS                        | 01 | 09 | 44          |          | Rg                       | 08 | 11 | 28          |
|          | eLQ                        | 01 | 12 | 04          |          | Z 2.5, E 2.5, N 3.0      |    |    |             |
|          | eLR (NW)                   | 01 | 15 | 04          |          |                          |    |    |             |
|          | Near Kodiak, Alaska        |    |    |             | 1        | eLQ                      | 12 | 30 | 34          |
|          | USCGS 00 48 36.5           |    |    |             |          | eLR                      | 12 | 32 | 04          |
|          | 55.8°N 153.9°W             |    |    | Dist. 52.1° |          |                          |    |    |             |
|          | Depth 26 km                |    |    | Mag 6-6 1/4 | 2        | ePcP                     | 00 | 14 | 04          |
|          | Z 17, E 63, N 37           |    |    |             |          | eS                       | 00 | 17 | 12          |
| 31       | eLR (SE)                   | 03 | 27 | 04          |          | eLQ                      | 00 | 19 | 44          |
|          |                            |    |    |             |          | eLR (WNW)                | 00 | 22 | 04          |
| 31       | eLR (NW)                   | 04 | 19 | 24          |          | Inyo Co., Calif.         |    |    |             |
|          |                            |    |    |             |          | USCGS 00 04 16.3         |    |    |             |
| 31       | eLQ                        | 07 | 16 | 04          |          | 37.2°N 118.6°W           |    |    | Dist. 34.9° |
|          | eLR (SW)                   | 07 | 21 | 04          |          | Depth 25 km              |    |    | Mag 4 3/4-5 |
|          |                            |    |    |             |          | Z -, E 2.5, N 5.0        |    |    |             |
| 31       | eLR                        | 16 | 09 | 04          | 2        | eLQ                      | 01 | 54 | 04          |
|          |                            |    |    |             |          | eLR (NW)                 | 01 | 58 | 04          |
| 31       | eLQ                        | 19 | 03 | 04          |          | Philippines              |    |    |             |
|          | eLR                        | 19 | 09 | 04          |          |                          |    |    |             |
|          | Aleutians                  |    |    |             | 2        | eLR                      | 09 | 02 | 04          |
|          |                            |    |    |             |          | Santa Cruz Islands       |    |    |             |
| 31       | eLQ                        | 21 | 55 | 04          |          |                          |    |    |             |
|          | eLR (W)                    | 21 | 57 | 04          | 2        | eLR                      | 18 | 23 | 04          |
| Feb. 1   | eLQ                        | 00 | 39 | 24          | 2        | eLR                      | 18 | 49 | 04          |
|          | eLR (NW)                   | 00 | 41 | 54          |          |                          |    |    |             |
|          | Rg                         | 00 | 43 | 34          | 2        | eLR                      | 20 | 42 | 04          |
| 1        | eS                         | 00 | 49 | 32          | 3        | eLQ                      | 02 | 50 | 04          |
|          | eSS                        | 00 | 52 | 16          |          | eLR                      | 02 | 53 | 04          |
|          | eLQ                        | 00 | 53 | 12          |          |                          |    |    |             |
|          | eLR (WNW)                  | 00 | 54 | 34          | 3        | eLR                      | 05 | 41 | 04          |
|          | Lg                         | 00 | 57 | 04          |          |                          |    |    |             |
|          | Rg                         | 00 | 59 | 44          | 3        | eLR                      | 11 | 44 | 04          |
|          | Off coast Vancouver, B. C. |    |    |             |          | Near coast Central Chile |    |    |             |
|          | USCGS 00 36 00.3           |    |    |             |          |                          |    |    |             |
|          | 50.2°N 129.7°W             |    |    | Dist. 39.4° | 3        | eLR                      | 14 | 27 | 04          |
|          | (continued)                |    |    |             |          | Honshu, Japan            |    |    |             |

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| Date   | Phase                | h            | m  | s  | Date   | Phase                | h            | m  | s  |
|--------|----------------------|--------------|----|----|--------|----------------------|--------------|----|----|
| Feb. 3 | eLR                  | 14           | 56 | 34 | Feb. 5 | eLQ                  | 10           | 35 | 04 |
|        | Argentina            |              |    |    |        | eLR                  | 10           | 37 | 34 |
| 3      | eLR (SE)             | 23           | 57 | 04 | 5      | eLR                  | 13           | 50 | 04 |
| 4      | eP                   | 01           | 22 | 50 | 5      | eP                   | 15           | 45 | 14 |
|        | epP                  | 01           | 23 | 19 |        | eS                   | 15           | 50 | 48 |
|        | eS                   | 01           | 30 | 52 |        | ePcS                 | 15           | 51 | 04 |
|        | eLR                  | 01           | 42 | 04 |        | eSS                  | 15           | 53 | 16 |
|        | Chile-Bolivia border |              |    |    |        | eLR (SW)             | 15           | 55 | 04 |
|        | USCGS 01 13 05.0     |              |    |    |        | South of Panama      |              |    |    |
|        | 18.3°S 69.3°W        | Dist. 58.8°  |    |    |        | USCGS 15 38 34.0     |              |    |    |
|        | Depth 178 km         |              |    |    |        | 8.0°N 82.8°W         | Dist. 33.8°  |    |    |
|        |                      |              |    |    |        | Depth 49 km          | Mag 5-5 1/4  |    |    |
| 4      | eLQ                  | 03           | 46 | 04 |        | Z 11, E -, N 15      |              |    |    |
|        | eLR                  | 03           | 48 | 04 |        |                      |              |    |    |
| 4      | e                    | 07           | 00 | 48 | 5      | eSS                  | 18           | 35 | 24 |
|        | e                    | 07           | 02 | 16 |        | eSSS                 | 18           | 41 | 04 |
|        | eLQ                  | 07           | 04 | 24 |        | e                    | 18           | 50 | 34 |
|        | eLR (SW)             | 07           | 08 | 16 |        | eLQ                  | 18           | 57 | 04 |
| 4      | eLR                  | 09           | 55 | 04 |        | eLR (SE)             | 19           | 05 | 24 |
|        | Northern Burma       |              |    |    |        | Indian Ocean         |              |    |    |
| 4      | eLQ                  | 13           | 28 | 04 |        | USCGS 17 50 51.1     |              |    |    |
|        | eLR                  | 13           | 36 | 04 |        | 38.4°S 78.2°E        | Dist. 158.1° |    |    |
|        |                      |              |    |    |        | Depth 25 km          | Mag 5 3/4-6  |    |    |
| 4      | eLQ                  | 13           | 55 | 04 |        | Z 6, E 8, N 4.5      |              |    |    |
|        | eLR                  | 14           | 00 | 04 | 6      | eLR                  | 00           | 11 | 04 |
| 4      | eLR                  | 16           | 06 | 44 | 6      | eLR                  | 00           | 43 | 04 |
|        | Fiji                 |              |    |    | 6      | eLR                  | 05           | 08 | 04 |
| 4      | ePS                  | 19           | 38 | 28 | 6      | eLR                  | 07           | 25 | 04 |
|        | ePPS                 | 19           | 39 | 44 |        | Tonga Islands        |              |    |    |
|        | eSS                  | 19           | 44 | 32 | 6      | eP                   | 10           | 39 | 58 |
|        | eSSS                 | 19           | 48 | 14 |        | epP                  | 10           | 40 | 28 |
|        | eLQ                  | 19           | 57 | 44 |        | ePcP                 | 10           | 40 | 41 |
|        | eLR                  | 20           | 05 | 04 |        | eS                   | 10           | 48 | 04 |
|        | East coast Formosa   |              |    |    |        | eSS                  | 10           | 52 | 24 |
|        | USCGS 19 09 12.9     |              |    |    |        | eLQ                  | 10           | 55 | 04 |
|        | 24.0°N 122.7°E       | Dist. 113.4° |    |    |        | eLR (SW)             | 10           | 58 | 04 |
|        | Depth 14 km          | Mag 5 3/4    |    |    |        | Chile-Bolivia border |              |    |    |
|        | Z -, E 6, N -        |              |    |    |        | USCGS 10 30 07.2     |              |    |    |
| 4      | eLR                  | 21           | 33 | 04 |        | 19.2°S 68.6°W        | Dist. 59.8°  |    |    |
|        |                      |              |    |    |        | Depth 181 km         |              |    |    |
| 5      | eLR                  | 00           | 52 | 04 | 6      | e                    | 11           | 53 | 54 |
|        | Kurile Islands       |              |    |    |        | e                    | 11           | 59 | 38 |
|        |                      |              |    |    |        | eLQ                  | 12           | 10 | 04 |
|        |                      |              |    |    |        | eLR                  | 12           | 17 | 04 |



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| Date   | Phase                        | h               | m  | s  | Date   | Phase              | h            | m  | s  |
|--------|------------------------------|-----------------|----|----|--------|--------------------|--------------|----|----|
| Feb. 6 | eP                           | 12              | 23 | 01 | Feb. 7 | eLR (NW)           | 03           | 58 | 04 |
|        | eS                           | 12              | 31 | 40 |        | Santa Cruz Islands |              |    |    |
|        | ePS                          | 12              | 32 | 04 |        |                    |              |    |    |
|        | eScS                         | 12              | 32 | 54 | 7      | eLR                | 04           | 59 | 04 |
|        | eSS                          | 12              | 36 | 04 |        | Santa Cruz Islands |              |    |    |
|        | eLQ                          | 12              | 39 | 04 |        |                    |              |    |    |
|        | eLR (NW)                     | 12              | 42 | 04 | 7      | eLR                | 06           | 28 | 34 |
|        | Andreanof Islands, Aleutians |                 |    |    |        | Sumatra            |              |    |    |
|        | USCGS 12 12 26.0             |                 |    |    |        |                    |              |    |    |
|        | 51.6°N 174.8°W               | Dist. 64.9°     |    |    | 7      | eLR                | 07           | 04 | 04 |
|        | Depth 77 km                  | Mag 5 1/4-5 1/2 |    |    |        | Santa Cruz Islands |              |    |    |
|        | Z 4, E 5, N 6                |                 |    |    |        |                    |              |    |    |
| 6      | eP                           | 18              | 28 | 01 |        |                    |              |    |    |
|        | eS                           | 18              | 38 | 40 | 7      | eLR                | 15           | 08 | 04 |
|        | eLQ                          | 18              | 53 | 44 |        | Honshu, Japan      |              |    |    |
|        | eLR                          | 18              | 58 | 44 |        |                    |              |    |    |
|        | Kurile Islands               |                 |    |    | 7      | eLQ                | 16           | 29 | 35 |
|        | USCGS 18 15 21.6             |                 |    |    |        | eLR                | 16           | 36 | 05 |
|        | 44.8°N 149.1°E               | Dist. 86.1°     |    |    |        | Formosa            |              |    |    |
|        | Depth 25 km                  |                 |    |    |        |                    |              |    |    |
| 6      | eLQ                          | 21              | 28 | 04 |        |                    |              |    |    |
|        | eLR                          | 21              | 32 | 04 | 7      | eS                 | 23           | 46 | 45 |
|        |                              |                 |    |    |        | ePS                | 23           | 47 | 05 |
| 6      | eP                           | 22              | 00 | 44 |        | eLQ                | 23           | 55 | 35 |
|        | ePKP                         | 22              | 04 | 07 |        | eLR (NW)           | 00           | 00 | 19 |
|        | epPKP                        | 22              | 04 | 21 |        | Aleutians          |              |    |    |
|        | ePP                          | 22              | 05 | 52 |        | USCGS 23 27 10.8   |              |    |    |
|        | ePKS                         | 22              | 07 | 24 |        | 51.4°N 177.2°W     | Dist. 66.5°  |    |    |
|        | eSKS                         | 22              | 11 | 12 |        | Depth 15 km        |              |    |    |
|        | eSKKS                        | 22              | 12 | 56 | 8      | ePS                | 03           | 07 | 25 |
|        | ePPS                         | 22              | 17 | 24 |        | eSS                | 03           | 14 | 13 |
|        | eSS                          | 22              | 23 | 00 |        | e                  | 03           | 20 | 05 |
|        | eSSS                         | 22              | 26 | 44 |        | e                  | 03           | 22 | 05 |
|        | eLQ                          | 22              | 35 | 04 |        | eLQ                | 03           | 27 | 45 |
|        | eLR (NW)                     | 22              | 43 | 04 |        | eLR                | 03           | 33 | 45 |
|        | eLR <sub>2</sub> (SE)        | 23              | 36 | 04 |        | New Hebrides       |              |    |    |
|        | Solomon Islands              |                 |    |    |        | USCGS 02 36 40.5   |              |    |    |
|        | USCGS 21 45 13.5             |                 |    |    |        | 15.3°S 167.5°E     | Dist. 120.8° |    |    |
|        | 6.8°S 155.3°E                | Dist. 124.9°    |    |    |        | Depth 162 km       |              |    |    |
|        | Depth 59 km                  |                 |    |    | 8      | eP                 | 08           | 12 | 24 |
| 6      | e                            | 22              | 41 | 25 |        | epP                | 08           | 14 | 17 |
|        | e                            | 22              | 41 | 47 |        | ePP                | 08           | 17 | 25 |
| 7      | eLR (NW)                     | 01              | 55 | 04 |        | eS                 | 08           | 18 | 49 |
|        |                              |                 |    |    |        | esS                | 08           | 22 | 25 |
| 7      | eLR (NW)                     | 02              | 42 | 04 |        | e (S)              | 08           | 27 | 05 |
|        | Santa Cruz Islands           |                 |    |    |        | Brazil-Peru border |              |    |    |
| 7      | eLR (SW)                     | 03              | 36 | 04 |        | USCGS 08 04 13.8   |              |    |    |
|        |                              |                 |    |    |        | 10.6°S 71.0°W      | Dist. 51.8°  |    |    |
|        |                              |                 |    |    |        | Depth 669 km       |              |    |    |

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| Date   | Phase                  | h  | m  | s            | Date    | Phase                  | h  | m  | s            |
|--------|------------------------|----|----|--------------|---------|------------------------|----|----|--------------|
| Feb. 8 | eLR                    | 18 | 19 | 06           | Feb. 11 | eS                     | 11 | 46 | 44           |
|        | Tonga Islands          |    |    |              |         | eLR                    | 11 | 53 | 06           |
| 9      | eLR                    | 01 | 01 | 06           |         | Argentina              |    |    |              |
|        | Solomon Islands        |    |    |              |         | USCGS 11 27 59.4       |    |    |              |
|        |                        |    |    |              |         | 23.3°S 65.9°W          |    |    | Dist. 64.1°  |
|        |                        |    |    |              |         | Depth 195 km           |    |    |              |
| 9      | eP                     | 02 | 23 | 36           |         |                        |    |    |              |
|        | ePKP                   | 02 | 27 | 06           | 11      | ePKP                   | 21 | 19 | 49           |
|        | ePP                    | 02 | 28 | 14           |         | ePP                    | 21 | 21 | 02           |
|        | eSKS                   | 02 | 33 | 42           |         | eSKS                   | 21 | 26 | 38           |
|        | eSKKS                  | 02 | 35 | 10           |         | eSKKS                  | 21 | 27 | 54           |
|        | ePKKP                  | 02 | 37 | 23           |         | ePKKP                  | 21 | 30 | 13           |
|        | ePS                    | 02 | 38 | 06           |         | ePS                    | 21 | 30 | 50           |
|        | ePPS                   | 02 | 39 | 18           |         | ePPS                   | 21 | 32 | 10           |
|        | eSS                    | 02 | 44 | 46           |         | eSS                    | 21 | 37 | 36           |
|        | eSSS                   | 02 | 49 | 06           |         | e (SKKKS)              | 21 | 41 | 16           |
|        | e (SSSS)               | 02 | 56 | 26           |         | eLQ                    | 21 | 50 | 26           |
|        | eLQ                    | 02 | 57 | 36           |         | eLR (WSW)              | 21 | 56 | 26           |
|        | eLR (WSW)              | 03 | 03 | 36           |         | eLR <sub>2</sub> (ENE) | 22 | 52 | 06           |
|        | eLR <sub>2</sub> (ENE) | 04 | 07 | 26           |         | Kermadec               |    |    |              |
|        | Kermadec               |    |    |              |         | USCGS 21 01 06.4       |    |    |              |
|        | USCGS 02 08 15.9       |    |    |              |         | 28.2°S 177.5°W         |    |    | Dist. 117.2° |
|        | 28.2°S 177.4°W         |    |    | Dist. 117.2° |         | Depth 41 km            |    |    | Mag 6        |
|        | Depth 37 km            |    |    | Mag 6-6 1/4  |         | Z 7, E 11, N 5.5       |    |    |              |
|        | Z 10, E 15, N 6.5      |    |    |              |         |                        |    |    |              |
| 9      | eLR                    | 09 | 01 | 06           | 12      | eP                     | 01 | 31 | 33           |
|        |                        |    |    |              |         | eS                     | 01 | 41 | 46           |
|        |                        |    |    |              |         | ePS                    | 01 | 42 | 34           |
| 9      | eLR                    | 20 | 41 | 10           |         | eSS                    | 01 | 46 | 46           |
|        |                        |    |    |              |         | eLQ                    | 01 | 53 | 26           |
| 9      | eLR                    | 21 | 34 | 06           |         | eLR (SW)               | 01 | 58 | 46           |
|        | Java                   |    |    |              |         | Easter Island region   |    |    |              |
|        |                        |    |    |              |         | USCGS 01 19 21.8       |    |    |              |
| 10     | eLQ                    | 14 | 24 | 46           |         | 34.8°S 106.9°W         |    |    | Dist. 81.5°  |
|        | eLR                    | 14 | 28 | 36           |         | Depth 100 km           |    |    | Mag 5        |
|        | Ceram Sea              |    |    |              |         | Z 2, E 2, N 2.5        |    |    |              |
| 10     | eLR                    | 17 | 30 | 06           | 12      | eS                     | 04 | 02 | 54           |
|        |                        |    |    |              |         | eLQ                    | 04 | 06 | 14           |
| 11     | eLR (NW)               | 01 | 56 | 06           |         | eLR                    | 04 | 09 | 18           |
|        |                        |    |    |              |         | Mexico-Arizona border  |    |    |              |
| 11     | eLR                    | 03 | 32 | 06           |         | USCGS 03 51 14.6       |    |    |              |
|        | Marianas               |    |    |              |         | 31.0°N 109.1°W         |    |    | Dist. 29.9°  |
|        |                        |    |    |              |         | Depth 63 km            |    |    |              |
| 11     | eS                     | 06 | 35 | 54           |         |                        |    |    |              |
|        | ePS                    | 06 | 36 | 12           | 12      | eLQ                    | 14 | 17 | 06           |
|        | eSS                    | 06 | 38 | 46           |         | eLR                    | 14 | 21 | 06           |
|        | eLQ                    | 06 | 43 | 46           |         | Alaska                 |    |    |              |
|        | eLR (SE)               | 06 | 46 | 46           |         |                        |    |    |              |
|        |                        |    |    |              | 12      | eLR                    | 16 | 39 | 06           |
|        |                        |    |    |              |         | Banda Sea              |    |    |              |

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| Date                    | Phase                 | h  | m  | s  | Date    | Phase                     | h               | m  | s  |
|-------------------------|-----------------------|----|----|----|---------|---------------------------|-----------------|----|----|
| Feb. 12                 | eP                    | 22 | 06 | 30 | Feb. 13 | eP                        | 16              | 40 | 10 |
|                         | iP                    | 22 | 06 | 33 |         | epP                       | 16              | 40 | 20 |
| P (Z) 11 sec 5 mic comp |                       |    |    |    |         | ePP                       | 16              | 43 | 44 |
|                         | epP                   | 22 | 06 | 44 |         | ePPP                      | 16              | 45 | 38 |
|                         | ePP                   | 22 | 09 | 50 |         | eS                        | 16              | 50 | 46 |
|                         | ePPP                  | 22 | 11 | 50 |         | eSKKS                     | 16              | 51 | 06 |
|                         | eSKS                  | 22 | 16 | 54 |         | ePS                       | 16              | 51 | 58 |
|                         | eS                    | 22 | 16 | 58 |         | eSS                       | 16              | 57 | 06 |
|                         | eSS                   | 22 | 23 | 50 |         | eLQ                       | 17              | 05 | 26 |
|                         | eLQ                   | 22 | 29 | 06 |         | eLR (NNW)                 | 17              | 10 | 06 |
|                         | eLR (NNW)             | 22 | 35 | 06 |         | Kurile Islands            |                 |    |    |
| Kurile Islands          |                       |    |    |    |         | USCGS 16 27 20.9          |                 |    |    |
| USCGS 21 53 43.5        |                       |    |    |    |         | 43.7°N 149.6°E            | Dist. 86.6°     |    |    |
| 43.7°N 147.6°E          | Dist. 87.3°           |    |    |    |         | Depth 25 km               | Mag 5 1/2-5 3/4 |    |    |
| Depth 45 km             | Mag 7                 |    |    |    |         | Z 4, E 6, N 6             |                 |    |    |
| Z 100, E 77, N 130*     |                       |    |    |    |         |                           |                 |    |    |
|                         |                       |    |    |    | 13      | eLQ                       | 23              | 22 | 26 |
| 12 eP                   | 23                    | 39 | 22 |    |         | eLR                       | 23              | 25 | 06 |
|                         | epP                   | 23 | 39 | 35 |         | Kurile Islands            |                 |    |    |
|                         | eS                    | 23 | 49 | 52 |         |                           |                 |    |    |
| 13 eLQ                  | 00                    | 01 | 06 |    | 14      | eLQ                       | 03              | 23 | 06 |
|                         | eLR                   | 00 | 07 | 06 |         | eLR                       | 03              | 28 | 06 |
| Kurile Islands          |                       |    |    |    |         |                           |                 |    |    |
| USCGS 23 26 34.5        |                       |    |    |    | 14      | eP                        | 03              | 34 | 51 |
| 44.0°N 147.7°E          | Dist. 87.3°           |    |    |    |         | epP                       | 03              | 35 | 04 |
| Depth 23 km             |                       |    |    |    |         | ePP                       | 03              | 37 | 22 |
|                         |                       |    |    |    |         | eS                        | 03              | 43 | 50 |
| 13 eLR                  | 04                    | 56 | 06 |    |         | eScS                      | 03              | 45 | 18 |
| Solomon Islands         |                       |    |    |    |         | e (SS)                    | 03              | 46 | 22 |
|                         |                       |    |    |    |         | eLQ                       | 03              | 49 | 26 |
| 13 ePP                  | 07                    | 04 | 36 |    |         | eLR (SSW)                 | 03              | 52 | 06 |
|                         | ePKS                  | 07 | 07 | 56 |         |                           |                 |    |    |
|                         | eSKS                  | 07 | 10 | 38 |         |                           |                 |    |    |
|                         | eSKS <sub>2</sub>     | 07 | 11 | 08 | 14      | eLQ                       | 04              | 00 | 26 |
|                         | eSKKS                 | 07 | 12 | 02 |         | eLR (NW)                  | 04              | 06 | 06 |
|                         | ePS                   | 07 | 13 | 44 |         | Kurile Islands            |                 |    |    |
|                         | ePPS                  | 07 | 14 | 48 |         |                           |                 |    |    |
|                         | eSS                   | 07 | 19 | 46 | 14      | eLQ                       | 06              | 22 | 06 |
|                         | eSKKS                 | 07 | 23 | 26 |         | eLR                       | 06              | 27 | 06 |
|                         | eLQ                   | 07 | 30 | 30 |         | Near coast southern Chile |                 |    |    |
|                         | eLR (NW)              | 07 | 36 | 26 |         |                           |                 |    |    |
|                         | eLR <sub>2</sub> (SE) | 08 | 51 | 06 | 14      | eLR (NW)                  | 16              | 42 | 06 |
| Tonga Islands           |                       |    |    |    |         | Samoa Islands region      |                 |    |    |
| USCGS 06 45 25.0        |                       |    |    |    |         |                           |                 |    |    |
| 17.0°S 173.7°W          | Dist. 108.4°          |    |    |    | 15      | eLR (SW)                  | 00              | 02 | 06 |
| Depth 43 km             | Mag 5 3/4 - 6         |    |    |    |         |                           |                 |    |    |
| Z 6, E 9, N 5.5         |                       |    |    |    | 15      | eLR (SW)                  | 01              | 30 | 06 |
|                         |                       |    |    |    |         |                           |                 |    |    |
| 13 e                    | 07                    | 30 | 23 |    |         |                           |                 |    |    |
| e                       | 07                    | 31 | 51 |    |         |                           |                 |    |    |



| Palisades, New York |                   |    |    | 13 |  |                  |    | 1961 |    |              |  |
|---------------------|-------------------|----|----|----|--|------------------|----|------|----|--------------|--|
| Date                | Phase             | h  | m  | s  | Date                                   | Phase            | h  | m    | s  |              |  |
| Feb. 15             | eLR (SW)          | 04 | 13 | 26 | Feb. 18                                | Kurile Islands   |    |      |    |              |  |
|                     | 15 eLR (SE)       | 07 | 50 | 06 | (cont'd)                               | USCGS 01 04 00.8 |    |      |    | Dist. 87.3°  |  |
|                     | 15 eP             | 10 | 58 | 02 |  | 44.0°N 147.5°E   |    |      |    | Depth 28 km  |  |
|                     | epP               | 10 | 58 | 12 | 18 eLQ                                 |                  | 09 | 03   | 37 |              |  |
|                     | ePP               | 11 | 01 | 38 | eLR                                    |                  | 09 | 10   | 07 |              |  |
|                     | ePPP              | 11 | 03 | 26 | 18 e (PKKS)                            |                  | 12 | 38   | 07 |              |  |
|                     | eS                | 11 | 08 | 40 | e (PKPPKP)                             |                  | 12 | 43   | 07 |              |  |
|                     | eSKKS             | 11 | 09 | 00 | eLQ                                    |                  | 12 | 51   | 47 |              |  |
|                     | ePS               | 11 | 09 | 30 | eLR                                    |                  | 12 | 57   | 07 |              |  |
|                     | ePPS              | 11 | 09 | 46 | Loyalty Islands region                 |                  |    |      |    |              |  |
|                     | eSS               | 11 | 15 | 20 | USCGS 12 05 36.3                       |                  |    |      |    |              |  |
|                     | eLQ               | 11 | 23 | 22 | 22.6°S 171.3°E                         |                  |    |      |    | Dist. 109.8° |  |
|                     | eLR (N)           | 11 | 28 | 06 | Depth 38 km                            |                  |    |      |    |              |  |
|                     | Kurile Islands    |    |    |    | 18 eP                                  |                  | 17 | 13   | 19 |              |  |
|                     | USCGS 10 45 15.9  |    |    |    | eS                                     |                  | 17 | 22   | 07 |              |  |
|                     | 43.7°N 147.4°E    |    |    |    | ePS                                    |                  | 17 | 22   | 37 |              |  |
|                     | Depth 69 km       |    |    |    | eSS                                    |                  | 17 | 26   | 03 |              |  |
|                     | Z 9.5, E 15, N 15 |    |    |    | eLQ                                    |                  | 17 | 29   | 27 |              |  |
|                     | 15 eLR            | 21 | 49 | 06 | eLR (SE)                               |                  | 17 | 32   | 57 |              |  |
|                     | 16 e              | 03 | 42 | 36 | Atlantic Ocean north of Ascension Isl. |                  |    |      |    |              |  |
|                     | eLQ               | 03 | 49 | 06 | USCGS 17 02 10.0                       |                  |    |      |    |              |  |
|                     | eLR               | 03 | 53 | 06 | 1.3°S 15.7°W                           |                  |    |      |    | Dist. 67.0°  |  |
|                     | 16 eLR            | 04 | 22 | 06 | Depth 25 km                            |                  |    |      |    | Mag 5        |  |
|                     | 16 eLR            | 05 | 37 | 06 | Z 4, E 4, N 1.5                        |                  |    |      |    |              |  |
|                     | 16 eP             | 14 | 07 | 36 | 18 e                                   |                  | 20 | 32   | 31 |              |  |
|                     | ePS               | 14 | 19 | 26 | e                                      |                  | 20 | 32   | 52 |              |  |
|                     | eLR (NW)          | 14 | 39 | 06 | 19 eLQ                                 |                  | 08 | 06   | 07 |              |  |
|                     | Kurile Islands    |    |    |    | eLR (NW)                               |                  | 08 | 15   | 07 |              |  |
|                     | USCGS 13 54 53.7  |    |    |    | East of Loyalty Islands                |                  |    |      |    |              |  |
|                     | 43.2°N 148.0°E    |    |    |    | 19 eLR (NW)                            |                  | 12 | 40   | 55 |              |  |
|                     | Depth 71 km       |    |    |    | Kodiak, Alaska                         |                  |    |      |    |              |  |
|                     | 17 eLR            | 00 | 57 | 06 | 19 ePS                                 |                  | 12 | 56   | 07 |              |  |
|                     | Tonga Islands     |    |    |    | eLQ                                    |                  | 13 | 05   | 27 |              |  |
|                     | 17 eLR            | 07 | 44 | 06 | eLR (SE)                               |                  | 13 | 09   | 07 |              |  |
|                     | Kurile Islands    |    |    |    | South Atlantic Ocean                   |                  |    |      |    |              |  |
|                     | 18 eS             | 01 | 27 | 37 | USCGS 12 33 41.9                       |                  |    |      |    |              |  |
|                     | eSS               | 01 | 35 | 27 | 14.1°S 13.9°W                          |                  |    |      |    | Dist. 77.8°  |  |
|                     | eLQ               | 01 | 44 | 37 | Depth 100 km                           |                  |    |      |    |              |  |
|                     | eLR (NW)          | 01 | 49 | 37 | 19 eLR (NW)                            |                  | 13 | 36   | 37 |              |  |
|                     | (continued)       |    |    |    | Kodiak, Alaska                         |                  |    |      |    |              |  |

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| Date    | Phase                   | h  | m  | s               | Date    | Phase               | h  | m  | s            |
|---------|-------------------------|----|----|-----------------|---------|---------------------|----|----|--------------|
| Feb. 20 | eLR (NW)                | 13 | 25 | 07              | Feb. 23 | eS                  | 04 | 40 | 41           |
| 20      | eLR (NW)                | 15 | 17 | 07              |         | eSS                 | 04 | 47 | 17           |
|         | New Ireland             |    |    |                 |         | eSSS                | 04 | 54 | 07           |
| 20      | eLR                     | 16 | 18 | 07              |         | e(SKKKS)            | 04 | 57 | 27           |
| 20      | eP                      | 18 | 37 | 07              |         | eLR (N)             | 05 | 00 | 47           |
|         | eS                      | 18 | 46 | 23              |         | Honshu, Japan       |    |    |              |
|         | e(ScS)                  | 18 | 47 | 17              |         | USCGS 04 16 25.     |    |    |              |
|         | e (PKKP)                | 18 | 55 | 51              |         | 38.2°N 142.7°E      |    |    | Dist. 94.4°  |
|         | eLR (SSE)               | 19 | 00 | 37              |         | Depth 119 km        |    |    | Mag 5 3/4    |
|         |                         |    |    |                 |         | Z 2.5, E 5.5, N 4.5 |    |    |              |
| 20      | eP                      | 22 | 35 | 07              | 23      | eLR (NE)            | 22 | 26 | 06           |
|         | eS                      | 22 | 41 | 39              |         | Turkey              |    |    |              |
|         | e                       | 22 | 43 | 27              | 24      | eLR                 | 02 | 34 | 06           |
|         | eSS                     | 22 | 44 | 55              |         | Solomon Islands     |    |    |              |
|         | eLQ                     | 22 | 45 | 55              | 24      | ePS                 | 03 | 33 | 31           |
|         | eLR (SSW)               | 22 | 48 | 07              |         | eSS                 | 03 | 39 | 16           |
|         | Ecuador                 |    |    |                 |         | eLQ                 | 03 | 53 | 14           |
|         | USCGS 22 27 00.4        |    |    |                 |         | eLR (NE)            | 03 | 57 | 32           |
|         | 2.5°S 77.6°W            |    |    | Dist. 43.9°     |         | Ryukyu Islands      |    |    |              |
|         | Depth 50 km             |    |    |                 |         | USCGS 03 04 11.7    |    |    |              |
| 21      | eL                      | 16 | 41 | 07              |         | 26.1°N 125.4°E      |    |    | Dist. 111°   |
|         |                         |    |    |                 |         | Depth 25 km         |    |    |              |
| 21      | eLR                     | 21 | 39 | 07              | 24      | eLR                 | 08 | 48 | 06           |
|         |                         |    |    |                 |         | Western Bolivia     |    |    |              |
| 22      | eL                      | 03 | 21 | 27              | 24      | eLQ                 | 22 | 34 | 06           |
|         | Aleutians               |    |    |                 |         | eLR                 | 22 | 37 | 06           |
| 22      | e                       | 08 | 48 | 19              | 25      | e                   | 01 | 49 | 36           |
| 22      | eLR                     | 17 | 05 | 07              |         | e                   | 01 | 53 | 14           |
|         |                         |    |    |                 |         | eLQ                 | 01 | 54 | 26           |
| 22      | ePP                     | 22 | 13 | 39              |         | eLR                 | 01 | 56 | 36           |
|         | eSKKS                   | 22 | 20 | 23              | 25      | eLR                 | 02 | 18 | 06           |
|         | ePS                     | 22 | 23 | 27              |         | New Hebrides        |    |    |              |
|         | ePPS                    | 22 | 24 | 35              | 25      | eLR (SW)            | 11 | 45 | 16           |
|         | eSS                     | 22 | 30 | 11              |         |                     |    |    |              |
|         | eSKKKS                  | 22 | 34 | 17              | 25      | eSS                 | 15 | 36 | 20           |
|         | eLQ                     | 22 | 42 | 37              |         | eLQ                 | 15 | 49 | 06           |
|         | eLR (WSW)               | 22 | 48 | 37              |         | eLR (NW)            | 15 | 53 | 26           |
|         | Kermadec Islands region |    |    |                 |         | Samoa               |    |    |              |
|         | USCGS 21 53 34.5        |    |    |                 |         | USCGS 15 02 04.8    |    |    |              |
|         | 28.4°S 177.2°W          |    |    | Dist. 117.2°    |         | 15.4°S 175.8°W      |    |    | Dist. 108.7° |
|         | Depth 78 km             |    |    | Mag 5 1/2-5 3/4 |         | Depth 62 km         |    |    |              |
|         | Z 8, E 6, N 2           |    |    |                 |         | Z 2.5, E 3.5, N 2.0 |    |    |              |
| 23      | eLR                     | 04 | 12 | 43              | 25      | eLR                 | 17 | 16 | 06           |

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| Date    | Phase                       | h  | m  | s  | Date    | Phase                             | h  | m  | s  |
|---------|-----------------------------|----|----|----|---------|-----------------------------------|----|----|----|
| Feb. 25 | e                           | 20 | 53 | 16 | Feb. 28 | e                                 | 04 | 03 | 37 |
|         | e                           | 20 | 53 | 36 |         |                                   |    |    |    |
| 26      | eP                          | 06 | 01 | 06 | 28      | e (PS)                            | 08 | 13 | 56 |
|         | eS                          | 06 | 11 | 16 |         | e (PPS)                           | 08 | 15 | 06 |
|         | eScS                        | 06 | 11 | 34 |         | e (SS)                            | 08 | 20 | 36 |
|         | ePS                         | 06 | 12 | 06 |         | eLQ                               | 08 | 33 | 26 |
|         | eSS                         | 06 | 16 | 46 |         | eLR                               | 08 | 40 | 06 |
|         | eSSS                        | 06 | 19 | 54 | 28      | eLQ                               | 13 | 23 | 06 |
|         | eLQ                         | 06 | 23 | 06 |         | eLR                               | 13 | 28 | 06 |
|         | eLR (SW)                    | 06 | 25 | 36 |         | Kurile Islands                    |    |    |    |
|         | Easter Island region        |    |    |    |         |                                   |    |    |    |
|         | USCGS 05 48 46.3            |    |    |    | 28      | eS                                | 21 | 37 | 38 |
|         | 32.7°S 111.2°W Dist. 81.2°  |    |    |    |         | eLQ                               | 21 | 44 | 50 |
|         | Depth 29 km Mag 5 1/2-5 3/4 |    |    |    |         | eLR                               | 21 | 50 | 26 |
|         | Z 3.5, E 7.0, N 5.0         |    |    |    |         | Salta Prov., Argentina            |    |    |    |
| 26      | eP                          | 18 | 24 | 50 |         | USCGS 21 18 11.3                  |    |    |    |
|         | P (Z) 16 sec 4 mic comp NNW |    |    |    |         | 24.1°S 66.6°W Dist. 65°           |    |    |    |
|         | ePP                         | 18 | 29 | 06 |         | Depth 30 km                       |    |    |    |
|         | ePPP                        | 18 | 31 | 26 | Mar. 1  | eLR                               | 00 | 12 | 06 |
|         | eSKS                        | 18 | 35 | 26 |         |                                   |    |    |    |
|         | eSKKS                       | 18 | 36 | 06 | 1       | eLR                               | 08 | 10 | 06 |
|         | eS                          | 18 | 36 | 34 |         |                                   |    |    |    |
|         | ePKKP                       | 18 | 40 | 26 | 1       | eLR                               | 10 | 41 | 06 |
|         | eSS                         | 18 | 44 | 06 |         |                                   |    |    |    |
|         | eSSS                        | 18 | 49 | 06 | 1       | eLR                               | 12 | 42 | 06 |
|         | eLQ                         | 18 | 54 | 06 |         |                                   |    |    |    |
|         | eLR (NNW)                   | 18 | 58 | 46 | 1       | eLR                               | 14 | 43 | 06 |
|         | Near Kyushu, Japan          |    |    |    |         | Near Java                         |    |    |    |
|         | USCGS 18 10 48.7            |    |    |    |         |                                   |    |    |    |
|         | 31.4°N 131.2°E Dist. 104.7° |    |    |    | 1       | eLQ                               | 20 | 19 | 06 |
|         | Depth 54 km Mag 7 1/4       |    |    |    |         | eLR                               | 20 | 26 | 06 |
|         | Z 115, E 125, N 135*        |    |    |    |         | Marianas Islands                  |    |    |    |
| 27      | eLQ                         | 09 | 28 | 06 | 1       | ePP                               | 23 | 54 | 06 |
|         | eLR                         | 09 | 31 | 06 |         | eS                                | 23 | 59 | 32 |
| 27      | eLR                         | 11 | 09 | 06 | 2       | eSS                               | 00 | 03 | 20 |
|         | Southern Chile              |    |    |    |         | eLQ                               | 00 | 05 | 24 |
|         |                             |    |    |    |         | eLR (SW)                          | 00 | 08 | 26 |
| 27      | eP                          | 18 | 07 | 06 |         | 1500 km west of Galapagos Islands |    |    |    |
|         | eLR                         | 18 | 56 | 46 |         | USCGS 23 42 43.8 Dist. 52.7       |    |    |    |
|         | Tadzik, SSR                 |    |    |    |         | 2.8°S 105.7°W Depth 59 km         |    |    |    |
|         | USCGS 17 53 35.9            |    |    |    |         | Z 3.5, E 2, N 4 Mag 5             |    |    |    |
|         | 38.4°N 74.7°E Dist. 96.3°   |    |    |    | 2       | eLR                               | 00 | 27 | 06 |
|         | Depth 48 km                 |    |    |    |         | Mexico-Guatemala border           |    |    |    |
| 27      | eLR                         | 22 | 18 | 06 | 2       | eLR                               | 02 | 45 | 06 |
|         | Aegean Sea                  |    |    |    |         |                                   |    |    |    |
|         |                             |    |    |    | 2       | eLR                               | 05 | 09 | 06 |



| Date   | Phase                         | h  | m  | s            | Date   | Phase                  | h  | m  | s             |
|--------|-------------------------------|----|----|--------------|--------|------------------------|----|----|---------------|
| Mar. 2 | eLR                           | 10 | 08 | 46           | Mar. 5 | ePKP                   | 01 | 45 | 13            |
|        | Solomon Islands               |    |    |              |        | epPKP                  | 01 | 45 | 24            |
|        |                               |    |    |              |        | ePS                    | 01 | 56 | 54            |
| 2      | eLR                           | 13 | 02 | 36           |        | eSS                    | 02 | 03 | 32            |
|        |                               |    |    |              |        | e (PKPPKP)             | 02 | 04 | 24            |
| 2      | eS                            | 15 | 35 | 39           |        | e (PKPPKS)             | 02 | 08 | 12            |
|        | ePS                           | 15 | 36 | 07           |        | eSSS                   | 02 | 12 | 14            |
|        | eSS                           | 15 | 39 | 51           |        | eLQ                    | 02 | 17 | 44            |
|        | eLQ                           | 15 | 41 | 53           |        | eLR (NW)               | 02 | 23 | 34            |
|        | eLR (SW)                      | 15 | 45 | 25           |        | Solomon Islands region |    |    |               |
|        | Pacific Ocean w. of Galapagos |    |    |              |        | USCGS 01 26 26.1       |    |    |               |
|        | USCGS 15 18 54.3              |    |    |              |        | 10.7°S 161.6°E         |    |    | Dist. 122.7°  |
|        | 4.7°S 106.3°W                 |    |    | Dist. 54.4°  |        | Depth 99 km            |    |    | Mag 5 3/4 - 6 |
|        | Depth 25 km                   |    |    | Mag 5        |        | Z 6, E 8.5, N 6        |    |    |               |
|        | Z 3.5, E 3, N 3.5             |    |    |              |        |                        |    |    |               |
|        |                               |    |    |              | 5      | eLR                    | 03 | 20 | 04            |
| 3      | eLR                           | 03 | 24 | 45           |        | Java                   |    |    |               |
|        |                               |    |    |              | 5      | e                      | 19 | 21 | 14            |
| 3      | eLR                           | 04 | 19 | 05           |        |                        |    |    |               |
|        | New Hebrides                  |    |    |              | 5      | eLR                    | 20 | 55 | 04            |
|        |                               |    |    |              |        | New Guinea             |    |    |               |
| 3      | eSS                           | 07 | 03 | 15           |        |                        |    |    |               |
|        | eSSS                          | 07 | 09 | 05           | 6      | eLR                    | 06 | 35 | 04            |
|        | eLQ                           | 07 | 19 | 25           |        |                        |    |    |               |
|        | eLR (NW)                      | 07 | 24 | 35           | 6      | eP                     | 12 | 15 | 30            |
|        | Loyalty Islands               |    |    |              |        | e                      | 12 | 16 | 01            |
|        | USCGS 06 25 37.9              |    |    |              |        | e                      | 12 | 16 | 48            |
|        | 22.9°S 171.4°E                |    |    | Dist. 123.3° |        | eS                     | 12 | 16 | 54            |
|        | Depth 27 km                   |    |    | Mag 5 1/2    |        | Lg                     | 12 | 17 | 44            |
|        | Z 2, E 3, N 2.5               |    |    |              |        | Ontario Prov., Canada  |    |    |               |
|        |                               |    |    |              |        | USCGS 12 13 31         |    |    |               |
| 3      | eLR (SW)                      | 09 | 15 | 05           |        | 48.1°N 80°W            |    |    | Dist. 8.23°   |
|        | Kermadec                      |    |    |              |        | Depth 49 km            |    |    |               |
|        |                               |    |    |              |        |                        |    |    |               |
| 3      | eS                            | 23 | 14 | 21           | 7      | eLR                    | 00 | 03 | 04            |
|        | eSS                           | 23 | 20 | 05           |        |                        |    |    |               |
|        | eLQ                           | 23 | 25 | 59           | 7      | eLR                    | 05 | 20 | 04            |
|        | eLR                           | 23 | 31 | 45           |        | Bonin Islands          |    |    |               |
|        | Near coast southern Chile     |    |    |              |        |                        |    |    |               |
|        | USCGS 22 51 15.6              |    |    |              | 7      | eP                     | 06 | 55 | 44            |
|        | 44.1°S 74.8°W                 |    |    | Dist. 84.6°  |        | ePP                    | 06 | 59 | 06            |
|        | Depth 95 km                   |    |    |              |        | e                      | 07 | 05 | 20            |
| 4      | eLR                           | 00 | 37 | 05           |        | eS                     | 07 | 06 | 12            |
|        | Central Chile                 |    |    |              |        | eSP                    | 07 | 07 | 04            |
|        |                               |    |    |              |        | ePPS                   | 07 | 07 | 44            |
| 4      | eLQ                           | 21 | 23 | 04           |        | eSS                    | 07 | 11 | 52            |
|        | eLR (SW)                      | 21 | 25 | 04           |        | eSSS                   | 07 | 15 | 24            |
|        | Near coast of El Salvador     |    |    |              |        | eLQ                    | 07 | 18 | 32            |
|        |                               |    |    |              |        | eLR (SSE)              | 07 | 22 | 34            |
|        |                               |    |    |              |        | G <sub>2</sub>         | 08 | 37 | 44            |

(continued)

| Palisades, New York |                       |    |    | 17            | 1961     |                     |    |    |              |
|---------------------|-----------------------|----|----|---------------|----------|---------------------|----|----|--------------|
| Date                | Phase                 | h  | m  | s             | Date     | Phase               | h  | m  | s            |
| Mar. 7              | Off coast of Chile    |    |    |               | Mar. 7   | ePPS                | 23 | 44 | 24           |
| (cont'd)            | USCGS 06 43 10.6      |    |    |               | (cont'd) | eSS                 | 23 | 49 | 58           |
|                     | 43.3°S 80.4°W         |    |    | Dist. 83.8°   |          | e                   | 23 | 54 | 04           |
|                     | Depth 60 km           |    |    |               |          | eLQ                 | 00 | 04 | 24           |
|                     |                       |    |    |               |          | eLR (NW)            | 00 | 11 | 34           |
| 7                   | eP                    | 10 | 25 | 36            |          | New Britain region  |    |    |              |
|                     | ePKP                  | 10 | 29 | 20            |          | USCGS 23 11 59.6    |    |    |              |
|                     | ePP                   | 10 | 30 | 24            |          | 4.7°S 153.2°E       |    |    | Dist. 124.8° |
|                     | e                     | 10 | 31 | 44            |          | Depth 90 km         |    |    |              |
|                     | ePKS                  | 10 | 33 | 04            |          |                     |    |    |              |
|                     | eSKS                  | 10 | 36 | 12            | 8        | eLR                 | 04 | 35 | 04           |
|                     | eSKKS                 | 10 | 37 | 28            |          | New Guinea          |    |    |              |
|                     | e                     | 10 | 38 | 22            |          |                     |    |    |              |
|                     | e                     | 10 | 39 | 30            | 8        | eLR                 | 06 | 27 | 04           |
|                     | ePS                   | 10 | 40 | 12            |          | Kermadec            |    |    |              |
|                     | ePKKS                 | 10 | 44 | 08            |          |                     |    |    |              |
|                     | eSS                   | 10 | 46 | 24            | 8        | eLR                 | 10 | 04 | 04           |
|                     | e                     | 10 | 49 | 34            |          |                     |    |    |              |
|                     | eSSS                  | 10 | 51 | 14            | 8        | eLQ                 | 13 | 33 | 04           |
|                     | eLQ                   | 10 | 57 | 34            |          | eLR                 | 13 | 39 | 04           |
|                     | eLR (WSW)             | 11 | 05 | 24            |          | Near coast of Chile |    |    |              |
|                     | Kermadec Islands      |    |    |               |          |                     |    |    |              |
|                     | USCGS 10 10 38.9      |    |    |               | 9        | eP                  | 04 | 06 | 56           |
|                     | 28.2°S 175.7°W        |    |    | Dist. 115.7°  |          | ePcP                | 04 | 08 | 44           |
|                     | Depth 43 km           |    |    | Mag 7 - 7 1/4 |          | eS                  | 04 | 13 | 12           |
|                     | Z 95, E 85, N 115*    |    |    |               |          | eLQ                 | 04 | 16 | 24           |
|                     |                       |    |    |               |          | eLR (SE)            | 04 | 18 | 04           |
| 7                   | ePKP                  | 19 | 28 | 40            |          | Atlantic Ocean      |    |    |              |
|                     | ePKP                  | 19 | 29 | 22            |          | USCGS 03 59 08.7    |    |    |              |
|                     | ePP                   | 19 | 32 | 56            |          | 10.9°N 41.7°W       |    |    | Dist. 41.0°  |
|                     | eSKS                  | 19 | 36 | 30            |          | Depth 27 km         |    |    | Mag 5        |
|                     | eSKSP                 | 19 | 43 | 32            |          | Z 3, E 3.5, N 5     |    |    |              |
|                     | ePPS                  | 19 | 46 | 08            |          |                     |    |    |              |
|                     | eSKSP                 | 19 | 48 | 12            | 9        | eLR                 | 09 | 27 | 04           |
|                     | eSS                   | 19 | 53 | 16            |          |                     |    |    |              |
|                     | eSKSSKS               | 19 | 53 | 56            | 9        | eLQ                 | 13 | 17 | 34           |
|                     | e                     | 19 | 54 | 44            |          | eLR (SW)            | 13 | 18 | 54           |
|                     | e                     | 19 | 58 | 24            |          |                     |    |    |              |
|                     | e                     | 20 | 08 | 20            | 9        | eLQ                 | 14 | 14 | 34           |
|                     | eLQ                   | 20 | 14 | 24            |          | eLR (SW)            | 14 | 16 | 04           |
|                     | eLR (SE)              | 20 | 23 | 14            |          |                     |    |    |              |
|                     | eLR <sub>2</sub> (NW) | 20 | 49 | 24            | 9        | e                   | 15 | 00 | 11           |
|                     | Indian Ocean          |    |    |               |          | e                   | 15 | 00 | 41           |
|                     | USCGS 19 08 36.1      |    |    |               |          | e                   | 15 | 00 | 44           |
|                     | 38.2°S 78.1°E         |    |    | Dist. 158.2°  |          | e                   | 15 | 01 | 29           |
|                     | Depth 30 km           |    |    | Mag 6         |          |                     |    |    |              |
|                     | Z 8, E 9, N 5         |    |    |               | 9        | e                   | 22 | 04 | 53           |
|                     |                       |    |    |               |          | eLQ                 | 22 | 10 | 03           |
| 7                   | ePP                   | 23 | 32 | 54            |          | eLR (SW)            | 22 | 14 | 03           |
|                     | ePKKP                 | 23 | 41 | 04            |          |                     |    |    |              |
|                     | (continued)           |    |    |               |          |                     |    |    |              |

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| Date    | Phase                    | h  | m  | s            | Date     | Phase                 | h  | m  | s                |
|---------|--------------------------|----|----|--------------|----------|-----------------------|----|----|------------------|
| Mar. 10 | eSS                      | 03 | 41 | 51           | Mar. 12  | eLQ                   | 03 | 05 | 02               |
|         | e                        | 03 | 47 | 43           | (cont'd) | eLR (WSW)             | 03 | 08 | 02               |
|         | e                        | 03 | 51 | 23           |          | Off coast Mexico      |    |    |                  |
|         | eLR                      | 04 | 01 | 03           |          | USCGS 02 49 33.4      |    |    |                  |
|         | Macquaire Island region  |    |    |              |          | 17.4°N 107.3°W        |    |    | Dist. 37.2°      |
|         | USCGS 03 00 43.3         |    |    |              |          | Depth 57 km           |    |    |                  |
|         | 51.9°S 161.6°E           |    |    | Dist. 140.9° |          | Z 3, E 4, N 6.5       |    |    |                  |
|         | Depth 25 km              |    |    |              |          |                       |    |    |                  |
| 10      | e                        | 23 | 17 | 52           | 12       | eLQ                   | 12 | 26 | 02               |
|         | eS                       | 23 | 24 | 16           |          | eLR                   | 12 | 32 | 02               |
|         | eLR (SE)                 | 23 | 28 | 02           |          | Off coast Mexico      |    |    |                  |
|         | Near coast of Costa Rica |    |    |              | 12       | eLR                   | 15 | 23 | 02               |
|         | USCGS 23 12 20.4         |    |    |              |          | Off coast Oregon      |    |    |                  |
|         | 10.1°N 83.6°W            |    |    | Dist. 32.2°  | 12       | e                     | 18 | 46 | 51               |
|         | Depth 56 km              |    |    |              |          | e                     | 18 | 47 | 14               |
| 11      | eP                       | 01 | 43 | 42           | 12       | eLR                   | 19 | 39 | 02               |
|         | e                        | 01 | 53 | 46           |          |                       |    |    |                  |
|         | eS                       | 01 | 54 | 14           | 12       | ePP                   | 23 | 41 | 42               |
|         | ePS                      | 01 | 54 | 38           |          | ePS                   | 23 | 51 | 06               |
|         | ePPS                     | 01 | 54 | 58           |          | eSS                   | 23 | 57 | 54               |
|         | eSS                      | 01 | 59 | 18           | 13       | eSKKKS                | 00 | 02 | 22               |
|         | eSSS                     | 02 | 03 | 52           |          | eSSS                  | 00 | 04 | 02               |
|         | eLQ                      | 02 | 05 | 42           |          | eLQ                   | 00 | 10 | 02               |
|         | eLR (NW)                 | 02 | 10 | 02           |          | eLR (SW)              | 00 | 16 | 02               |
|         | Kurile Islands           |    |    |              |          | Tonga Islands region  |    |    |                  |
|         | USCGS 01 31 34.4         |    |    |              |          | USCGS 23 21 42.5      |    |    |                  |
|         | 48.7°N 154.6°E           |    |    | Dist. 80.5°  |          | 28.4°S 176.0°W        |    |    | Dist. 116.4°     |
|         | Depth 26 km              |    |    | Mag 5 3/4-6  |          | Depth 113 km          |    |    | Mag 5 1/2- 5 3/4 |
|         | Z 5.5, E 13, N 7         |    |    |              |          | Z 4, E 5.5, N 2.5     |    |    |                  |
| 11      | e (S)                    | 09 | 06 | 02           | 13       | eLR (NW)              | 05 | 56 | 02               |
|         | ePPS                     | 09 | 08 | 26           |          | New Britain           |    |    |                  |
|         | eSS                      | 09 | 13 | 50           | 13       | eP                    | 08 | 10 | 40               |
|         | e                        | 09 | 17 | 22           |          | ePP                   | 08 | 11 | 52               |
|         | eLQ                      | 09 | 23 | 02           |          | ePPP                  | 08 | 12 | 12               |
|         | eLR (E)                  | 09 | 28 | 02           |          | e                     | 08 | 15 | 16               |
|         | British Somaliland       |    |    |              |          | eS                    | 08 | 16 | 18               |
|         | USCGS 08 41 00.0         |    |    |              |          | ePcS                  | 08 | 16 | 54               |
|         | 11.2°N 43.3°E            |    |    | Dist. 102.2° |          | eSS                   | 08 | 18 | 42               |
|         | Depth 18 km              |    |    |              |          | eLQ                   | 08 | 19 | 10               |
|         | Z 3, E 4, N 3            |    |    |              |          | eLR (WSW)             | 08 | 21 | 02               |
| 11      | eLQ                      | 19 | 55 | 02           |          | Off west coast Mexico |    |    |                  |
|         | eLR                      | 19 | 57 | 32           |          | USCGS 08 03 43.9      |    |    |                  |
| 11      | eP                       | 22 | 00 | 45           |          | 19.2°N 107.3°W        |    |    | Dist. 35.7°      |
|         | eS                       | 22 | 01 | 07           |          | Depth 49 km           |    |    | Mag 6            |
| 12      | eS                       | 03 | 02 | 30           |          | Z 12, E 25, N 80      |    |    |                  |
|         | (continued)              |    |    |              |          |                       |    |    |                  |



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| Date    | Phase              | h            | m  | s  | Date    | Phase                | h               | m  | s  |
|---------|--------------------|--------------|----|----|---------|----------------------|-----------------|----|----|
| Mar. 13 | e                  | 10           | 57 | 54 | Mar. 15 | eLQ                  | 23              | 13 | 02 |
|         |                    |              |    |    |         | eLR                  | 23              | 16 | 02 |
| 13      | eLQ                | 19           | 50 | 02 |         |                      |                 |    |    |
|         | eLR                | 19           | 55 | 02 | 15      | eLR                  | 23              | 46 | 02 |
|         | Crete              |              |    |    |         |                      |                 |    |    |
| 13      | e                  | 20           | 51 | 02 | 16      | e                    | 05              | 00 | 02 |
|         | eSKS               | 20           | 59 | 56 |         | Kermadec             |                 |    |    |
|         | epS                | 21           | 02 | 28 | 16      | e                    | 05              | 09 | 07 |
|         | eLR (SE)           | 21           | 24 | 02 |         | eLQ                  | 05              | 29 | 42 |
|         | Sandwich Islands   |              |    |    |         | eLR (NW)             | 05              | 35 | 02 |
|         | USCGS 20 35 15.4   |              |    |    | 16      | eLR                  | 07              | 44 | 02 |
|         | 56.2°S 27.2°W      | Dist. 104.5° |    |    |         | Sunda Strait         |                 |    |    |
|         | Depth 56 km        |              |    |    |         |                      |                 |    |    |
| 13      | eLR (NW)           | 22           | 02 | 02 | 16      | eLR                  | 08              | 47 | 02 |
|         | Fiji               |              |    |    |         | Tonga Islands        |                 |    |    |
| 14      | eLQ                | 01           | 57 | 22 | 16      | ePPS                 | 11              | 54 | 22 |
|         | eLR (NW)           | 02           | 01 | 32 |         | eSS                  | 12              | 01 | 02 |
|         | Japan              |              |    |    |         | eLQ                  | 12              | 19 | 02 |
| 14      | eLR                | 03           | 21 | 42 |         | eLR                  | 12              | 26 | 22 |
| 14      | eLQ                | 12           | 26 | 02 |         | Banda Sea            |                 |    |    |
|         | eLR (NW)           | 12           | 31 | 42 |         | USCGS 11 19 43.5     |                 |    |    |
|         | Bering Strait      |              |    |    |         | 6.4°S 130.7°E        | Dist. 138.6°    |    |    |
|         | USCGS 11 58 53.9   |              |    |    |         | Depth 77 km          |                 |    |    |
|         | 67.8°N 164.9°W     | Dist. 53.1°  |    |    | 16      | ePKP                 | 14              | 05 | 05 |
|         | Depth 78 km        |              |    |    |         | iPKP <sub>1</sub>    | 14              | 05 | 07 |
| 14      | eLR                | 20           | 45 | 32 |         | ePKP <sub>2</sub>    | 14              | 05 | 34 |
|         |                    |              |    |    |         | epPKP                | 14              | 06 | 34 |
| 15      | eSKS               | 10           | 41 | 22 |         | ePKKP                | 14              | 14 | 58 |
|         | ePKKP              | 10           | 44 | 02 |         | ePKKS                | 14              | 18 | 22 |
|         | ePKKS              | 10           | 47 | 32 |         | ePPS                 | 14              | 21 | 02 |
|         | eSS                | 10           | 52 | 34 |         | e (PKPPKP)           | 14              | 22 | 30 |
|         | e                  | 11           | 05 | 12 |         | eSS                  | 14              | 27 | 02 |
|         | eLQ                | 11           | 07 | 02 |         | e                    | 14              | 31 | 42 |
|         | eLR (NW)           | 11           | 14 | 02 |         | eLQ                  | 14              | 45 | 22 |
|         | New Ireland region |              |    |    |         | eLR (N)              | 14              | 53 | 32 |
|         | USCGS 10 14 55.5   |              |    |    |         | eLR <sub>2</sub> (S) | 15              | 26 | 42 |
|         | 3.3°S 150.7°E      | Dist. 124.7° |    |    |         | Flores Island        |                 |    |    |
|         | Depth 21 km        | Mag 6        |    |    |         | USCGS 13 45 35.6     |                 |    |    |
|         | Z 7.5, E 8.5, N 10 |              |    |    |         | 8.2°S 122.0°E        | Dist. 144.2     |    |    |
|         |                    |              |    |    |         | Depth 74 km          | Mag 6 1/4-6 1/2 |    |    |
|         |                    |              |    |    |         | Z 10, E 13, N 16     |                 |    |    |
| 15      | eLQ                | 13           | 53 | 32 | 16      | ePKP                 | 18              | 40 | 46 |
|         | eLR                | 13           | 59 | 22 |         | eSS                  | 19              | 02 | 46 |
|         | New Britain        |              |    |    |         | e                    | 19              | 04 | 32 |
| 15      | eLR                | 18           | 55 | 02 |         | e                    | 19              | 08 | 26 |
|         |                    |              |    |    |         | e                    | 19              | 14 | 02 |
|         |                    |              |    |    |         | eLQ                  | 19              | 21 | 02 |
|         |                    |              |    |    |         | eLR (N)              | 19              | 25 | 32 |

| Palisades, New York |                      |              |    | 20 | 1961    |                      |              |    |    |
|---------------------|----------------------|--------------|----|----|---------|----------------------|--------------|----|----|
| Date                | Phase                | h            | m  | s  | Date    | Phase                | h            | m  | s  |
| Mar. 16             | Flores Island        |              |    |    | Mar. 17 | eLR (SW)             | 23           | 21 | 22 |
| (cont'd)            | USCGS 18 21 12.2     |              |    |    |         |                      |              |    |    |
|                     | 8.1°S 122.0°E        | Dist. 144.2° |    |    | 18      | ePKP                 | 02           | 28 | 12 |
|                     | Depth 43 km          |              |    |    |         | eSS                  | 02           | 49 | 02 |
|                     |                      |              |    |    |         | eSKSSKS              | 02           | 51 | 02 |
| 16                  | eLR                  | 21           | 06 | 02 |         | eLQ                  | 03           | 08 | 18 |
|                     | Tonga Islands        |              |    |    |         | eLR                  | 03           | 17 | 02 |
|                     |                      |              |    |    |         | Flores Islands       |              |    |    |
| 16                  | eLR                  | 23           | 34 | 02 |         | USCGS 02 08 38.5     |              |    |    |
|                     | Tonga Islands        |              |    |    |         | 8.2°S 122.0°E        | Dist. 144.8° |    |    |
|                     |                      |              |    |    |         | Depth 35 km          |              |    |    |
| 17                  | e                    | 00           | 00 | 02 |         |                      |              |    |    |
|                     | eLR                  | 00           | 11 | 32 | 18      | eSS                  | 09           | 02 | 42 |
|                     | Tonga Islands        |              |    |    |         | eSSS                 | 09           | 07 | 22 |
| 17                  | eLR                  | 00           | 43 | 02 |         | eLQ                  | 09           | 17 | 02 |
|                     |                      |              |    |    |         | eLR (SW)             | 09           | 22 | 32 |
| 17                  | eLR                  | 06           | 05 | 02 |         | Tonga Islands        |              |    |    |
|                     |                      |              |    |    |         | USCGS 08 26 49.0°    |              |    |    |
| 17                  | eLR                  | 13           | 15 | 02 |         | 24.3°S 174.2°W       | Dist. 112.6° |    |    |
|                     |                      |              |    |    |         | Depth 25 km          |              |    |    |
| 17                  | eSKS                 | 14           | 31 | 22 |         |                      |              |    |    |
|                     | ePS                  | 14           | 36 | 02 | 18      | ePKP                 | 15           | 14 | 44 |
|                     | eSS                  | 14           | 42 | 38 |         | eSS                  | 15           | 36 | 22 |
|                     | eLQ                  | 14           | 55 | 02 |         | ePKPPKS              | 15           | 39 | 34 |
|                     | eLR (SW)             | 15           | 02 | 02 |         | e                    | 15           | 41 | 12 |
|                     | Tonga Islands        |              |    |    |         | eSSS                 | 15           | 44 | 42 |
|                     | USCGS 14 06 51.6     |              |    |    |         | eSS <sub>2</sub>     | 15           | 48 | 02 |
|                     | 23.7°S 176.0°W       | Dist. 114.2° |    |    |         | eLQ                  | 15           | 52 | 02 |
|                     | Depth 49 km          | Mag 5 3/4    |    |    |         | eLR (WSW)            | 15           | 59 | 22 |
|                     | Z 5, E 2.5, N 6      |              |    |    |         | South of New Zealand |              |    |    |
| 17                  | eLR (W)              | 17           | 15 | 42 |         | USCGS 14 54 59.3     |              |    |    |
|                     |                      |              |    |    |         | 49.9°S 163.3°E       | Dist. 140°   |    |    |
| 17                  | eLR                  | 19           | 12 | 02 |         | Depth 38 km          | Mag 6 1/2    |    |    |
|                     |                      |              |    |    |         | Z 19, E 14, N 18*    |              |    |    |
| 17                  | ePP                  | 20           | 30 | 38 | 18      | eLQ                  | 23           | 27 | 02 |
|                     | eSKS                 | 20           | 36 | 02 | 19      | eLR (NW)             | 00           | 03 | 02 |
|                     | ePS                  | 20           | 39 | 48 |         |                      |              |    |    |
|                     | eSS                  | 20           | 46 | 18 | 19      | iPKP                 | 05           | 18 | 48 |
|                     | e                    | 20           | 50 | 22 |         | ePPS                 | 05           | 35 | 02 |
|                     | e                    | 20           | 56 | 12 |         | e                    | 05           | 36 | 14 |
|                     | eLQ                  | 20           | 57 | 32 |         | eSS                  | 05           | 42 | 02 |
|                     | eLR (SW)             | 21           | 04 | 34 |         | e                    | 05           | 47 | 34 |
|                     | Tonga Islands region |              |    |    |         | e                    | 06           | 01 | 46 |
|                     | USCGS 20 10 36.4     |              |    |    |         | eLQ                  | 06           | 07 | 42 |
|                     | 24.3°S 175.6°W       | Dist. 114.2° |    |    |         | eLR (NNE)            | 06           | 13 | 22 |
|                     | Depth 79 km          | Mag 5 3/4-6  |    |    |         | Sunda Strait         |              |    |    |
|                     | Z 9, E 11, N 4       |              |    |    |         | USCGS 04 59 19.3     |              |    |    |
| 17                  | eLR                  | 22           | 19 | 02 |         | 6.4°S 105.5°E        | Dist. 145°   |    |    |
|                     |                      |              |    |    |         | Depth 120 km         |              |    |    |

| Date    | Phase                    | h  | m  | s            | Date     | Phase                | h  | m  | s               |
|---------|--------------------------|----|----|--------------|----------|----------------------|----|----|-----------------|
| Mar. 19 | eSS                      | 07 | 52 | 12           | Mar. 20  | Tonga Islands        |    |    |                 |
|         | eLQ                      | 08 | 05 | 02           | (cont'd) | USCGS 15 53 09.9     |    |    |                 |
|         | eLR (NW)                 | 08 | 11 | 02           |          | 18.4°S 175.2°W       |    |    | Dist. 109.8°    |
|         | New Hebrides             |    |    |              |          | Depth 175 km         |    |    | Mag 6 1/4-6 1/2 |
|         | USCGS 07 14 57.4         |    |    |              |          | Z 8, E 12, N 24      |    |    |                 |
|         | 16.0°S 168.2°E           |    |    | Dist. 121.4° | Mar. 20  | eP                   | 23 | 57 | 51              |
|         | Depth 90 km              |    |    |              | 21       | ePP                  | 00 | 02 | 39              |
| 19      | eLQ                      | 12 | 57 | 22           |          | eSKS                 | 00 | 08 | 03              |
|         | eLR (NW)                 | 13 | 06 | 22           |          | eSKKKS               | 00 | 09 | 59              |
|         | New Hebrides             |    |    |              |          | ePKKP                | 00 | 11 | 43              |
|         |                          |    |    |              |          | ePS                  | 00 | 12 | 11              |
| 19      | eSS                      | 21 | 09 | 36           |          | ePPS                 | 00 | 12 | 57              |
|         | eLQ                      | 21 | 25 | 02           |          | e                    | 00 | 14 | 31              |
|         | eLR (SW)                 | 21 | 29 | 02           |          | ePKKS                | 00 | 15 | 51              |
|         | Tonga Islands            |    |    |              |          | eSS                  | 00 | 18 | 19              |
|         | USCGS 20 33 55.7         |    |    |              |          | eSKKKS               | 00 | 21 | 59              |
|         | 24.1°S 176.1°W           |    |    | Dist. 114°   |          | eSSS                 | 00 | 22 | 59              |
|         | Depth 39 km              |    |    |              |          | e                    | 00 | 26 | 03              |
| 20      | eP comp fromSW           | 06 | 22 | 39           |          | eLQ                  | 00 | 31 | 03              |
|         | epP                      | 06 | 22 | 51           |          | eLR (W)              | 00 | 36 | 33              |
|         | ePP                      | 06 | 24 | 02           |          | Tonga Islands region |    |    |                 |
|         | eS                       | 06 | 27 | 14           |          | USCGS 23 42 33.9     |    |    |                 |
|         | esS                      | 06 | 28 | 10           |          | 24.2°S 175.9°W       |    |    | Dist. 114.2°    |
|         | eSS                      | 06 | 30 | 06           |          | Depth 25 km          |    |    | Mag 6 1/2       |
|         | eLQ                      | 06 | 31 | 10           |          | Z 28, E 33, N 11     |    |    |                 |
|         | eLR (SW)                 | 06 | 32 | 02           | 21       | eLR                  | 07 | 05 | 03              |
|         | Off west coast Nicaragua |    |    |              | 21       | eLR                  | 07 | 22 | 03              |
|         | USCGS 06 16 23.9         |    |    |              | 21       | eLR                  | 08 | 36 | 03              |
|         | 11.5°N 86.3°W            |    |    | Dist. 30.8°  | 21       | eLR                  | 10 | 36 | 03              |
|         | Depth 122 km             |    |    | Mag 5 3/4-6  |          | South of Fiji        |    |    |                 |
|         | Z 40, E 38, N 57         |    |    |              | 21       | eLR                  | 12 | 15 | 03              |
| 20      | eP                       | 16 | 08 | 13           | 21       | e                    | 17 | 14 | 51              |
|         | epP                      | 16 | 08 | 47           | 21       | eLR (SW)             | 20 | 53 | 03              |
|         | ePP                      | 16 | 12 | 25           |          | Loyalty Islands      |    |    |                 |
|         | epPP                     | 16 | 12 | 47           | 22       | eSS                  | 04 | 52 | 23              |
|         | eSKS                     | 16 | 17 | 49           |          | eLQ                  | 05 | 07 | 03              |
|         | eSKKS                    | 16 | 18 | 49           |          | eLR (NW)             | 05 | 12 | 03              |
|         | esSKS                    | 16 | 19 | 31           |          | Solomon Islands      |    |    |                 |
|         | e                        | 16 | 20 | 53           |          | USCGS 04 14 03.4     |    |    |                 |
|         | eSP                      | 16 | 21 | 15           |          | 9.0°S 157.9°E        |    |    | Dist. 124.2°    |
|         | ePS                      | 16 | 21 | 37           |          | Depth 41 km          |    |    |                 |
|         | eSS                      | 16 | 27 | 31           |          |                      |    |    |                 |
|         | esSS                     | 16 | 28 | 47           |          |                      |    |    |                 |
|         | eSSS                     | 16 | 31 | 31           |          |                      |    |    |                 |
|         | esSSS                    | 16 | 32 | 57           |          |                      |    |    |                 |
|         | e (LQ)                   | 16 | 39 | 29           |          |                      |    |    |                 |
|         | eLR (WNW)                | 16 | 45 | 03           |          |                      |    |    |                 |
|         | (continued)              |    |    |              |          |                      |    |    |                 |

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| Date    | Phase                         | h  | m  | s           | Date     | Phase                          | h  | m  | s            |
|---------|-------------------------------|----|----|-------------|----------|--------------------------------|----|----|--------------|
| Mar. 22 | eLQ                           | 07 | 32 | 03          | Mar. 25  | eLR                            | 02 | 30 | 03           |
|         | eLR (W)                       | 07 | 34 | 03          | (cont'd) | Ecuador                        |    |    |              |
|         | Tonga Islands                 |    |    |             |          | USCGS 02 09 59.9               |    |    |              |
| 22      | e (P)                         | 14 | 26 | 23          |          | 2.1°S 79.4°W                   |    |    | Dist. 43.0°  |
|         | eLQ                           | 14 | 31 | 11          |          | Depth 25 km                    |    |    |              |
|         | eLR (SW)                      | 14 | 34 | 15          | 25       | eLR                            | 20 | 04 | 03           |
|         | Near coast Nicaragua          |    |    |             |          |                                |    |    |              |
|         | USCGS 14 19 46.5              |    |    |             | 25       | eLQ                            | 22 | 03 | 03           |
|         | 11.8°N 86.8°W                 |    |    | Dist. 31.1° |          | eLR (SE)                       | 22 | 09 | 03           |
|         | Depth 172 km                  |    |    |             |          | South Indian Ocean             |    |    |              |
| 22      | eLR                           | 18 | 44 | 03          | 26       | eLR (NW)                       | 15 | 32 | 33           |
| 23      | eLR                           | 03 | 35 | 03          |          | Philippine Islands             |    |    |              |
| 23      | eLR                           | 18 | 54 | 03          | 26       | eSS                            | 21 | 08 | 03           |
| 23      | eLR                           | 21 | 48 | 03          |          | eLQ                            | 21 | 23 | 33           |
|         | Solomon Islands               |    |    |             |          | eLR (NW)                       | 21 | 29 | 03           |
| 24      | eLQ                           | 06 | 19 | 03          |          | Bismarck Sea                   |    |    |              |
|         | eLR                           | 06 | 26 | 03          |          | USCGS 20 29 05.7               |    |    |              |
| 24      | e                             | 15 | 35 | 13          |          | 3.1°S 146.2°E                  |    |    | Dist. 127.8° |
|         | e                             | 15 | 37 | 03          | 26       | Depth 25 km                    |    |    |              |
|         | eLQ                           | 15 | 38 | 55          | 26       | eLR                            | 22 | 24 | 03           |
|         | eLR (W)                       | 15 | 41 | 43          | 27       | eLR                            | 07 | 08 | 03           |
| 24      | eLR                           | 17 | 29 | 03          | 27       | eLR                            | 07 | 42 | 03           |
| 24      | eLR                           | 20 | 27 | 03          | 27       | eL                             | 09 | 17 | 03           |
|         | Philippine Islands            |    |    |             |          | Southwest Nevada               |    |    |              |
| 24      | eSKKS                         | 23 | 22 | 07          | 27       | eLR (W)                        | 12 | 17 | 03           |
|         | ePS                           | 23 | 23 | 33          |          |                                |    |    |              |
|         | eSS                           | 23 | 29 | 03          |          | eP                             | 21 | 00 | 37           |
|         | eSKKS                         | 23 | 34 | 45          |          | ePP                            | 21 | 02 | 12           |
|         | eLQ                           | 23 | 40 | 19          |          | eS                             | 21 | 06 | 51           |
|         | eLR (NNW)                     | 23 | 46 | 03          |          | eSS                            | 21 | 10 | 03           |
|         | Near east coast Honshu, Japan |    |    |             |          | e (ScS)                        | 21 | 11 | 27           |
|         | USCGS 22 57 14.2              |    |    |             |          | eLR (SW)                       | 21 | 12 | 43           |
|         | 35.3°N 140.9°E                |    |    | Dist. 97.8° |          | Pacific Ocean 700 mi. south of |    |    |              |
|         | Depth 102 km                  |    |    | Mag 5       |          | Michoacan, Mexico              |    |    |              |
|         | Z 2, E 3.5, N 3.5             |    |    |             |          | USCGS 20 52 39.3               |    |    |              |
| 25      | eLR (NW)                      | 00 | 38 | 03          |          | 8.8°N 104.2°W                  |    |    | Dist. 41.5°  |
|         | Near coast of New Guinea      |    |    |             |          | Depth 26 km                    |    |    | Mag 4 3/4-5  |
| 25      | eS                            | 02 | 24 | 31          |          | Z 2, E 2.5, N 4                |    |    |              |
|         | eLQ                           | 02 | 28 | 03          | 27       | eLR                            | 22 | 45 | 03           |
|         | (continued)                   |    |    |             | 27       | eLR                            | 23 | 47 | 03           |



| Palisades, New York |                              |              |    | 23 |          |                       | 1961         |    |    |
|---------------------|------------------------------|--------------|----|----|----------|-----------------------|--------------|----|----|
| Date                | Phase                        | h            | m  | s  | Date     | Phase                 | h            | m  | s  |
| Mar. 28             | eLR                          | 06           | 36 | 03 | Mar. 28  | Depth 125 km          | Mag 5-5 1/4  |    |    |
|                     | Aleutian Islands             |              |    |    | (cont'd) | Z 2, E 3.5, N 3.5     |              |    |    |
| 28                  | eP                           | 09           | 52 | 19 | 28       | eLR                   | 23           | 11 | 02 |
|                     | ePKP                         | 09           | 54 | 57 |          |                       |              |    |    |
|                     | iPKP                         | 09           | 55 | 13 | 29       | eLR                   | 07           | 25 | 02 |
|                     | ePP                          | 09           | 57 | 43 |          | Honshu, Japan         |              |    |    |
|                     | iPKS                         | 09           | 58 | 35 |          |                       |              |    |    |
|                     | epPKS                        | 09           | 59 | 21 | 29       | eLR                   | 10           | 57 | 02 |
|                     | ePPS                         | 10           | 10 | 35 |          | Northern Celebes      |              |    |    |
|                     | eSS                          | 10           | 16 | 19 |          |                       |              |    |    |
|                     | eLQ <sub>1</sub>             | 10           | 32 | 53 | 29       | eLQ                   | 18           | 57 | 02 |
|                     | eLR <sub>1</sub> (NNW)       | 10           | 41 | 43 |          | eLR                   | 19           | 01 | 02 |
|                     | eLQ <sub>2</sub>             | 11           | 09 | 03 |          | Honshu, Japan         |              |    |    |
|                     | eLR <sub>2</sub> (SSE)       | 11           | 21 | 03 | 30       | eLR                   | 00           | 19 | 02 |
|                     | Northern Celebes             |              |    |    |          |                       |              |    |    |
|                     | USCGS 09 35 55.4             |              |    |    | 30       | eLR                   | 01           | 34 | 02 |
|                     | 0.2°N 123.6°E                | Dist. 136.1° |    |    |          |                       |              |    |    |
|                     | Depth 83 km                  | Mag 7        |    |    | 30       | eP                    | 07           | 49 | 42 |
|                     | Z 28, E 25, N 52*            |              |    |    |          | ePP                   | 07           | 50 | 42 |
| 28                  | iP                           | 12           | 39 | 53 |          | eS                    | 07           | 55 | 18 |
|                     | iS                           | 12           | 48 | 35 |          | ePcS                  | 07           | 55 | 46 |
|                     | eSS                          | 12           | 53 | 03 |          | eLQ                   | 07           | 57 | 22 |
|                     | eLQ                          | 12           | 56 | 03 |          | eLR (WSW)             | 07           | 59 | 42 |
|                     | eLR (NW)                     | 13           | 01 | 03 |          | Lg                    | 08           | 01 | 02 |
|                     | Andreanof Islands, Aleutians |              |    |    |          | Rg                    | 08           | 04 | 02 |
|                     | USCGS 12 29 12.7             |              |    |    |          | Gulf of California    |              |    |    |
|                     | 51.7°N 176.2°W               | Dist. 65.4°  |    |    |          | USCGS 07 42 59.4      |              |    |    |
|                     | Depth 60 km                  | Mag 5 1/2    |    |    |          | 22.0°N 107.8°W        | Dist. 34.4°  |    |    |
|                     | Z 8, E 13, N 10              |              |    |    |          | Depth 20 km           | Mag 5 1/2    |    |    |
|                     |                              |              |    |    |          | Z 9, E 14, N 13       |              |    |    |
| 28                  | eLR                          | 18           | 15 | 02 | 30       | eSKS                  | 09           | 14 | 46 |
|                     |                              |              |    |    |          | eSKKKS                | 09           | 16 | 02 |
| 28                  | eLR                          | 20           | 29 | 02 |          | ePS                   | 09           | 17 | 42 |
|                     |                              |              |    |    |          | ePPS                  | 09           | 18 | 42 |
| 28                  | iP Dil from S.               | 21           | 12 | 16 |          | eSS                   | 09           | 23 | 36 |
|                     | epP                          | 21           | 12 | 35 |          | eSKKS                 | 09           | 27 | 22 |
|                     | ePcP                         | 21           | 12 | 47 |          | e (PKPPKP)            | 09           | 28 | 10 |
|                     | epPcP                        | 21           | 12 | 58 |          | e (PKPSKS)            | 09           | 33 | 54 |
|                     | ePP                          | 21           | 14 | 42 |          | eLQ                   | 09           | 35 | 32 |
|                     | ePcS                         | 21           | 16 | 58 |          | eLR <sub>1</sub> (NW) | 09           | 40 | 22 |
|                     | iS                           | 21           | 20 | 38 |          | eLR <sub>2</sub> (SE) | 10           | 50 | 02 |
|                     | eScS                         | 21           | 21 | 28 |          | Samoa Islands region  |              |    |    |
|                     | eSS                          | 21           | 23 | 50 |          | USCGS 08 49 45.6      |              |    |    |
|                     | eLQ                          | 21           | 28 | 10 |          | 15.2°S 172.8°W        | Dist. 106.5° |    |    |
|                     | eLR (SSE)                    | 21           | 31 | 32 |          | Depth 25 km           | Mag 5 3/4    |    |    |
|                     | Chile-Bolivia border region  |              |    |    |          | Z 5.5, E 7, N 3.5     |              |    |    |
|                     | USCGS 21 01 56.2             |              |    |    | 30       | eLR                   | 11           | 02 | 02 |
|                     | 22.0°S 68.0°W                | Dist. 62.8°  |    |    |          |                       |              |    |    |
|                     | (continued)                  |              |    |    |          |                       |              |    |    |

| Palisades, New York |                                  |             |    | 24 |          |                                   | 1961        |    |    |
|---------------------|----------------------------------|-------------|----|----|----------|-----------------------------------|-------------|----|----|
| Date                | Phase                            | h           | m  | s  | Date     | Phase                             | h           | m  | s  |
| Mar. 30             | eLQ                              | 13          | 01 | 02 | Apr. 4   | e (LQ)                            | 10          | 26 | 01 |
|                     | eLR                              | 13          | 05 | 02 | (cont'd) | eLR (NNE)                         | 10          | 31 | 31 |
|                     |                                  |             |    |    |          | Sinkiang Province, China          |             |    |    |
| 31                  | eLQ                              | 21          | 52 | 22 |          | USCGS 09 46 36.6                  |             |    |    |
|                     | eLR                              | 21          | 56 | 02 |          | 40.1°N 77.8°E                     | Dist. 95.4° |    |    |
|                     |                                  |             |    |    |          | Depth 16 km                       | Mag 6       |    |    |
| Apr. 1              | ePP                              | 15          | 35 | 40 |          | Z 13.5, E 8, N 12*                |             |    |    |
|                     | ePPP                             | 15          | 37 | 38 |          |                                   |             |    |    |
|                     | eSKS                             | 15          | 42 | 24 | 4        | eLR                               | 20          | 21 | 01 |
|                     | ePS                              | 15          | 44 | 20 |          |                                   |             |    |    |
|                     | ePPS                             | 15          | 44 | 36 | 4        | eLR                               | 21          | 50 | 01 |
|                     | eSS                              | 15          | 49 | 44 |          |                                   |             |    |    |
|                     | eSSS                             | 15          | 53 | 34 | 5        | eLR (NW)                          | 05          | 27 | 01 |
|                     | eLQ                              | 15          | 57 | 32 |          |                                   |             |    |    |
|                     | eLR (NNE)                        | 16          | 03 | 02 | 5        | eP                                | 07          | 00 | 01 |
|                     | Sinkiang Province, China         |             |    |    |          | eLR                               | 07          | 38 | 01 |
|                     | USCGS 15 18 22.8                 |             |    |    |          | Sinkiang, China                   |             |    |    |
|                     | 39.6°N 77.7°E                    | Dist. 95.4° |    |    |          |                                   |             |    |    |
|                     | Depth 21 km                      | Mag 6       |    |    | 5        | eL                                | 09          | 25 | 01 |
|                     | Z 15, E 8, N 18*                 |             |    |    |          |                                   |             |    |    |
|                     |                                  |             |    |    | 5        | eLR                               | 19          | 10 | 01 |
| 2                   | eLR                              | 01          | 15 | 02 |          |                                   |             |    |    |
|                     |                                  |             |    |    | 5        | e                                 | 20          | 40 | 32 |
| 2                   | eLR                              | 09          | 11 | 22 |          | e                                 | 20          | 40 | 54 |
|                     |                                  |             |    |    |          |                                   |             |    |    |
| 2                   | eLR                              | 09          | 21 | 22 | 5        | eLR                               | 22          | 43 | 01 |
|                     |                                  |             |    |    |          | Macquarie Island region           |             |    |    |
| 2                   | eLQ                              | 15          | 20 | 22 |          |                                   |             |    |    |
|                     | eLR (W)                          | 15          | 24 | 22 | 6        | eLQ                               | 02          | 16 | 01 |
|                     | 700 km NW of Easter Island       |             |    |    |          | eLR (NE)                          | 02          | 19 | 31 |
|                     |                                  |             |    |    |          | Sinkiang, China                   |             |    |    |
| 2                   | eLQ                              | 21          | 38 | 12 | 6        | eP                                | 04          | 12 | 03 |
|                     | eLR                              | 21          | 45 | 22 |          | eS                                | 04          | 17 | 57 |
|                     |                                  |             |    |    |          | ePcS                              | 04          | 18 | 21 |
| 2                   | eLR                              | 23          | 32 | 02 |          | eSS                               | 04          | 20 | 35 |
|                     |                                  |             |    |    |          | eLQ                               | 04          | 21 | 31 |
| 3                   | eS                               | 08          | 05 | 42 |          | eLR (WNW)                         | 04          | 24 | 01 |
|                     | eLQ                              | 08          | 07 | 02 |          | Near coast of Northern California |             |    |    |
|                     | eLR (SW)                         | 08          | 08 | 12 |          | USCGS 04 04 46.1                  |             |    |    |
|                     | North of Swan Island, Carib. Sea |             |    |    |          | 40.1°N 124.8°W                    | Dist. 38.4° |    |    |
|                     | USCGS 07 55 52.1                 |             |    |    |          | Depth 73 km                       |             |    |    |
|                     | 17.5°N 84.1°W                    | Dist. 24.5° |    |    | 6        | eLQ                               | 12          | 54 | 01 |
|                     | Depth 92 km                      |             |    |    |          | eLR                               | 12          | 57 | 01 |
| 4                   | eLR                              | 02          | 03 | 31 |          |                                   |             |    |    |
|                     | China                            |             |    |    | 6        | eLQ                               | 15          | 08 | 22 |
| 4                   | eSKS                             | 10          | 10 | 41 |          | eLR (NE)                          | 15          | 14 | 02 |
|                     | ePS                              | 10          | 12 | 47 |          | Near coast of Sumatra             |             |    |    |
|                     | ePPS                             | 10          | 13 | 13 |          |                                   |             |    |    |
|                     | eSS                              | 10          | 18 | 17 | 6        | eLQ                               | 18          | 55 | 02 |
|                     | eSSS                             | 10          | 22 | 05 |          | eLR (NE)                          | 19          | 00 | 02 |
|                     | (continued)                      |             |    |    |          | Southern Iran                     |             |    |    |

| Palisades, New York |                        |    |    | 25 |        |                            |    | 1961 |    |                 |  |
|---------------------|------------------------|----|----|----|--------|----------------------------|----|------|----|-----------------|--|
| Date                | Phase                  | h  | m  | s  | Date   | Phase                      | h  | m    | s  |                 |  |
| Apr. 6              | eLQ                    | 23 | 29 | 32 | Apr. 8 | eSKKKS                     | 16 | 38   | 52 |                 |  |
|                     | eLR                    | 23 | 36 | 02 |        | eSSS                       | 16 | 47   | 32 |                 |  |
|                     | Sumatra                |    |    |    |        | eLQ                        | 16 | 52   | 02 |                 |  |
|                     |                        |    |    |    |        | eLR (WNW)                  | 16 | 58   | 02 |                 |  |
| 7                   | eLR                    | 07 | 35 | 02 |        | New Hebrides               |    |      |    |                 |  |
|                     |                        |    |    |    |        | USCGS 15 59 49.2           |    |      |    |                 |  |
| 7                   | eS                     | 20 | 15 | 22 |        | 18.2°S 168.6°E             |    |      |    | Dist. 121.9°    |  |
|                     | eSS                    | 20 | 20 | 02 |        | Depth 120 km               |    |      |    |                 |  |
|                     | eLQ                    | 20 | 25 | 32 |        |                            |    |      |    |                 |  |
|                     | eLR (NW)               | 20 | 28 | 32 | 8      | eP Comp from S             | 18 | 11   | 46 |                 |  |
|                     | Kamchatka              |    |    |    |        | ePP                        | 18 | 14   | 34 |                 |  |
|                     | USCGS 19 54 51.9       |    |    |    |        | ePPP                       | 18 | 17   | 02 |                 |  |
|                     | 57.2°N 163.3°E         |    |    |    |        | eS                         | 18 | 21   | 46 |                 |  |
|                     | Depth 20 km            |    |    |    |        | ePS                        | 18 | 22   | 32 |                 |  |
|                     |                        |    |    |    |        | eSS                        | 18 | 26   | 30 |                 |  |
| 7                   | e                      | 20 | 16 | 52 |        | eSSS                       | 18 | 30   | 22 |                 |  |
|                     | e                      | 20 | 17 | 18 |        | eLQ                        | 18 | 33   | 22 |                 |  |
|                     |                        |    |    |    |        | eLR (SSE)                  | 18 | 36   | 22 |                 |  |
| 7                   | eLQ                    | 22 | 06 | 32 |        | Chile                      |    |      |    |                 |  |
|                     | eLR (NE)               | 22 | 08 | 02 |        | USCGS 17 59 46.7           |    |      |    |                 |  |
|                     | Kirghin-Tadzhik border |    |    |    |        | 38.2°S 72.7°W              |    |      |    | Dist. 78.6°     |  |
|                     |                        |    |    |    |        | Depth 60 km                |    |      |    | Mag 5 3/4-6     |  |
| 8                   | eLQ                    | 00 | 47 | 42 |        | Z 6, E 8, N 12             |    |      |    |                 |  |
|                     | eLR (NE)               | 00 | 50 | 32 |        |                            |    |      |    |                 |  |
|                     |                        |    |    |    | 8      | ePS                        | 22 | 05   | 31 |                 |  |
| 8                   | eLQ                    | 03 | 22 | 02 |        | eSS                        | 22 | 11   | 47 |                 |  |
|                     | eLR                    | 03 | 25 | 32 |        | eSSS                       | 22 | 19   | 03 |                 |  |
|                     | Near coast of Ecuador  |    |    |    |        | eLQ                        | 22 | 22   | 43 |                 |  |
|                     |                        |    |    |    |        | eLR (NW)                   | 22 | 29   | 03 |                 |  |
| 8                   | eS                     | 04 | 36 | 42 |        | Marianas Islands           |    |      |    |                 |  |
|                     | eLR (SE)               | 04 | 43 | 32 |        | USCGS 21 36 41.6           |    |      |    |                 |  |
|                     | Ecuador                |    |    |    |        | 14.8°N 145.1°E             |    |      |    | Dist. 113.6°    |  |
|                     | USCGS 04 22 08.7       |    |    |    |        | Depth 105 km               |    |      |    |                 |  |
|                     | 2.2°S 79.2°W           |    |    |    |        |                            |    |      |    |                 |  |
|                     | Depth 25 km            |    |    |    |        |                            |    |      |    |                 |  |
|                     |                        |    |    |    | 9      | e (P)                      | 07 | 30   | 55 |                 |  |
| 8                   | eLQ                    | 05 | 01 | 32 |        | eS                         | 07 | 36   | 11 |                 |  |
|                     | eLR (SE)               | 05 | 08 | 02 |        | ePcS                       | 07 | 36   | 23 |                 |  |
|                     | Ecuador                |    |    |    |        | eLQ                        | 07 | 38   | 33 |                 |  |
|                     |                        |    |    |    |        | eLR (WNW)                  | 07 | 41   | 03 |                 |  |
| 8                   | eP                     | 09 | 11 | 50 |        | Lg                         | 07 | 43   | 03 |                 |  |
|                     | ePPP                   | 09 | 14 | 02 |        | Rg                         | 07 | 46   | 03 |                 |  |
|                     | eS                     | 09 | 18 | 10 |        | San Benito Co., California |    |      |    |                 |  |
|                     | eLQ                    | 09 | 21 | 02 |        | USCGS 07 23 16.0           |    |      |    |                 |  |
|                     | eLR (SE)               | 09 | 25 | 02 |        | 36.5°N 121.3°W             |    |      |    | Dist. 36.5°     |  |
|                     | Ecuador                |    |    |    |        | Depth 11 km                |    |      |    | Mag 5 1/2-5 3/4 |  |
|                     | USCGS 09 03 48.9       |    |    |    |        | Z 25, E -, N 21            |    |      |    |                 |  |
|                     | 2.1°S 79.1°W           |    |    |    |        |                            |    |      |    |                 |  |
|                     | Depth 24 km            |    |    |    |        |                            |    |      |    |                 |  |
|                     |                        |    |    |    | 9      | eP                         | 09 | 33   | 33 |                 |  |
| 8                   | ePS                    | 16 | 32 | 32 |        | ePP (NW)                   | 09 | 41   | 03 |                 |  |
|                     | (continued)            |    |    |    |        | Fiji                       |    |      |    |                 |  |
|                     |                        |    |    |    |        | USCGS 09 21 29.0           |    |      |    |                 |  |
|                     |                        |    |    |    |        | (continued)                |    |      |    |                 |  |

| Date     | Phase                     | h            | m       | s   | Date | Phase                           | h               | m  | s  |
|----------|---------------------------|--------------|---------|-----|------|---------------------------------|-----------------|----|----|
| Apr. 9   | 26.0°S 178.4°E            | Dist. 119.7° | Apr. 12 | eLQ | 12   | 42                              | 23              |    |    |
| (cont'd) | Depth 655 km              |              |         | eLR | 12   | 49                              | 03              |    |    |
| 9        | ePP                       | 15           | 54      | 39  | 12   | eLR                             | 15              | 45 | 03 |
|          | ePKS                      | 15           | 56      | 57  |      | Kurile Islands                  |                 |    |    |
|          | eSKS                      | 16           | 00      | 27  |      |                                 |                 |    |    |
|          | eSKKS                     | 16           | 01      | 41  | 12   | eLR                             | 18              | 10 | 03 |
|          | ePS                       | 16           | 04      | 11  |      | Northern Celebes                |                 |    |    |
|          | ePPS                      | 16           | 05      | 19  |      |                                 |                 |    |    |
|          | eSS                       | 16           | 10      | 35  | 12   | eLR                             | 18              | 49 | 03 |
|          | eLQ                       | 16           | 23      | 43  |      | Kurile Islands                  |                 |    |    |
|          | eLR (N)                   | 16           | 29      | 33  |      |                                 |                 |    |    |
|          | Near coast of Formosa     |              |         |     | 12   | iP                              | 22              | 26 | 41 |
|          | USCGS 15 35 05.4          |              |         |     |      | P (Z) 7 sec 2 mic comp from SSW |                 |    |    |
|          | 24.1°N 122.2°E            | Dist. 113.6° |         |     |      | epP                             | 22              | 27 | 01 |
|          | Depth 13 km               | Mag 6-6 1/4  |         |     |      | ePP                             | 22              | 27 | 29 |
|          | Z 12, E 8, N 9*           |              |         |     |      | epPP                            | 22              | 27 | 55 |
| 9        | eP                        | 17           | 27      | 50  |      | eS                              | 22              | 31 | 35 |
|          | Chile-Peru border         |              |         |     |      | esS                             | 22              | 31 | 59 |
|          | USCGS 17 17 47.6          |              |         |     |      | ePcS                            | 22              | 33 | 11 |
|          | 18.2°S 70.2°W             | Dist. 58.8°  |         |     |      | eLQ                             | 22              | 33 | 55 |
|          | Depth 29 km               |              |         |     |      | eLR (SSW)                       | 22              | 35 | 03 |
| 10       | e                         | 07           | 54      | 33  |      | El Salvador                     |                 |    |    |
|          | eLQ                       | 07           | 57      | 33  |      | USCGS 22 20 33.6                |                 |    |    |
|          | eLR                       | 08           | 02      | 03  |      | 13.1°N 88.9°W                   | Dist. 30.8°     |    |    |
| 10       | eLR                       | 13           | 21      | 43  |      | Depth 122 km                    | Mag 5 1/4-5 1/2 |    |    |
|          |                           |              |         |     |      | Z 13, E 25, N 19                |                 |    |    |
| 10       | eLR                       | 17           | 40      | 03  | 13   | eLR                             | 06              | 05 | 03 |
|          | Honshu, Japan             |              |         |     |      |                                 |                 |    |    |
| 10       | eSS                       | 20           | 20      | 19  | 13   | ePP                             | 16              | 51 | 53 |
|          | e                         | 20           | 30      | 53  |      | eSKS                            | 16              | 58 | 47 |
|          | eLQ                       | 20           | 39      | 43  |      | ePS                             | 17              | 00 | 49 |
|          | eLR (NW)                  | 20           | 43      | 33  |      | eSS                             | 17              | 06 | 19 |
|          | Near coast of New Guinea  |              |         |     |      | e (PcPPKP)                      | 17              | 09 | 43 |
|          | USCGS 19 40 15.9          |              |         |     |      | eSSS                            | 17              | 13 | 23 |
|          | 0.2°S 132.9°E             | Dist. 133.3  |         |     |      | eLQ                             | 17              | 15 | 03 |
|          | Depth 36 km               |              |         |     |      | eLR (NNE)                       | 17              | 19 | 15 |
| 11       | eLR                       | 11           | 59      | 03  |      | Sinkiang, China                 |                 |    |    |
|          |                           |              |         |     |      | USCGS 16 34 39.1                |                 |    |    |
| 11       | eLR                       | 12           | 35      | 33  |      | 40.1°N 77.8°E                   | Dist. 95.4°     |    |    |
|          |                           |              |         |     |      | Depth 19 km                     | Mag 6 1/2       |    |    |
| 11       | eLQ                       | 18           | 44      | 03  |      | Z 30, E 42, N 43                |                 |    |    |
|          | eLR                       | 18           | 46      | 03  | 14   | eLR                             | 04              | 42 | 23 |
|          | Sumbawa Islands           |              |         |     |      |                                 |                 |    |    |
| 11       | eLQ                       | 20           | 52      | 03  | 14   | eLR                             | 13              | 45 | 03 |
|          | eLR (NW)                  | 20           | 56      | 03  |      | Marianas Islands                |                 |    |    |
|          | North of Vancouver Island |              |         |     | 14   | eLR                             | 17              | 32 | 33 |



| Palisades, New York |                                    |    |    | 27 |         |                        |    | 1961 |    |  |  |
|---------------------|------------------------------------|----|----|----|---------|------------------------|----|------|----|--|--|
| Date                | Phase                              | h  | m  | s  | Date    | Phase                  | h  | m    | s  |  |  |
| Apr. 15             | eLQ                                | 01 | 13 | 33 | Apr. 17 | eLQ                    | 00 | 14   | 03 |  |  |
|                     | eLR                                | 01 | 18 | 03 |         | eLR                    | 00 | 20   | 03 |  |  |
|                     | Honshu, Japan                      |    |    |    |         | South coast New Guinea |    |      |    |  |  |
| 15                  | eLQ                                | 02 | 18 | 03 | 17      | e                      | 02 | 53   | 29 |  |  |
|                     | eLR                                | 02 | 21 | 03 |         | eLQ                    | 03 | 10   | 23 |  |  |
|                     |                                    |    |    |    |         | eLR                    | 03 | 15   | 03 |  |  |
| 15                  | eLR                                | 07 | 23 | 03 | 17      | eLR                    | 04 | 31   | 33 |  |  |
| 15                  | eLQ                                | 10 | 31 | 03 | 17      | eLR                    | 07 | 54   | 33 |  |  |
|                     | eLR                                | 10 | 35 | 33 |         |                        |    |      |    |  |  |
|                     | Kermadec Islands                   |    |    |    | 17      | eLQ                    | 13 | 54   | 03 |  |  |
| 15                  | eL                                 | 12 | 46 | 03 |         | eLR                    | 14 | 01   | 03 |  |  |
| 15                  | eLR                                | 18 | 50 | 03 | 17      | i                      | 14 | 29   | 14 |  |  |
| 16                  | eLR                                | 01 | 02 | 33 | 17      | i                      | 16 | 14   | 36 |  |  |
| 16                  | eLQ                                | 05 | 17 | 03 | 17      | eLQ                    | 16 | 43   | 23 |  |  |
|                     | eLR                                | 05 | 19 | 03 |         | eLR (SE)               | 16 | 46   | 17 |  |  |
|                     | Central Utah                       |    |    |    |         | Mid Atlantic           |    |      |    |  |  |
|                     | USCGS 05 02 39.3                   |    |    |    |         | USCGS 16 21 10.2       |    |      |    |  |  |
|                     | 39.1°N 111.5°W                     |    |    |    |         | 3.9°N 31.5°W           |    |      |    |  |  |
|                     | Depth 35km                         |    |    |    |         |                        |    |      |    |  |  |
| 16                  | eLR                                | 09 | 08 | 03 | 17      | eP                     | 20 | 46   | 03 |  |  |
|                     |                                    |    |    |    |         | eS                     | 20 | 53   | 33 |  |  |
| 16                  | eP                                 | 11 | 52 | 24 |         | eLQ                    | 21 | 00   | 37 |  |  |
|                     | eLR                                | 12 | 08 | 03 |         | eLR (S)                | 21 | 04   | 23 |  |  |
|                     | Kamchatka                          |    |    |    |         | Chile-Bolivia border   |    |      |    |  |  |
|                     | USCGS 11 40 40.7                   |    |    |    |         | USCGS 20 35 15.4       |    |      |    |  |  |
|                     | 53.5°N 158.7°E                     |    |    |    |         | 20.8°S 68.5°W          |    |      |    |  |  |
|                     | Depth 27 km                        |    |    |    |         | Dist. 61.8°            |    |      |    |  |  |
| 16                  | eSS                                | 12 | 39 | 11 | 18      | eLQ                    | 05 | 08   | 33 |  |  |
|                     | eLQ                                | 12 | 41 | 03 |         | eLR                    | 05 | 11   | 43 |  |  |
|                     | eLR (WNW)                          | 12 | 43 | 23 | 18      | eLQ                    | 05 | 47   | 03 |  |  |
|                     | Off northwest coast Vancouver Isl. |    |    |    |         | eLR                    | 05 | 53   | 03 |  |  |
|                     | 51.6°N 130.6°W                     |    |    |    |         |                        |    |      |    |  |  |
|                     | Depth 50 km                        |    |    |    | 18      | eLR                    | 09 | 21   | 03 |  |  |
|                     | USCGS 12 22 47.1                   |    |    |    |         | Kurile Islands         |    |      |    |  |  |
| 16                  | eLQ                                | 12 | 58 | 03 | 18      | eLR                    | 13 | 20   | 03 |  |  |
|                     | eLR (NW)                           | 13 | 05 | 33 |         |                        |    |      |    |  |  |
| 16                  | eLQ                                | 17 | 46 | 03 | 18      | eLR                    | 14 | 52   | 03 |  |  |
|                     | eLR                                | 17 | 50 | 03 |         | Banda Sea              |    |      |    |  |  |
| 16                  | eLQ                                | 22 | 40 | 03 | 18      | e                      | 19 | 11   | 35 |  |  |
|                     | eLR                                | 22 | 46 | 03 |         | e                      | 19 | 20   | 03 |  |  |
|                     |                                    |    |    |    |         | eLQ                    | 19 | 25   | 03 |  |  |
|                     |                                    |    |    |    |         | eLR (SE)               | 19 | 31   | 03 |  |  |

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| Date    | Phase             | h               | m  | s  | Date    | Phase                  | h            | m  | s  |
|---------|-------------------|-----------------|----|----|---------|------------------------|--------------|----|----|
| Apr. 19 | eL                | 07              | 47 | 03 | Apr. 20 | eL                     | 01           | 11 | 03 |
| 19      | eSS               | 08              | 17 | 17 | 20      | eL                     | 01           | 48 | 03 |
|         | eLQ               | 08              | 36 | 03 |         |                        |              |    |    |
|         | eLR               | 08              | 41 | 03 | 20      | eL                     | 03           | 12 | 03 |
|         | New Hebrides      |                 |    |    |         |                        |              |    |    |
|         | USCGS 07 39 12.8  |                 |    |    | 20      | e                      | 04           | 01 | 54 |
|         | 18.2°S 168.2°E    | Dist. 122.6°    |    |    |         | e                      | 04           | 01 | 59 |
|         | Depth 98 km       |                 |    |    |         | e                      | 04           | 02 | 33 |
| 19      | eL                | 09              | 43 | 03 | 20      | eLQ                    | 06           | 26 | 03 |
| 19      | i                 | 15              | 09 | 59 |         | eLR                    | 06           | 32 | 03 |
|         |                   |                 |    |    |         | Kurile Islands         |              |    |    |
| 19      | eP                | 16              | 25 | 43 | 20      | eL                     | 12           | 07 | 03 |
|         | eS                | 16              | 35 | 43 |         |                        |              |    |    |
|         | eSS               | 16              | 42 | 43 | 20      | eLQ                    | 13           | 55 | 23 |
|         | eLQ               | 16              | 50 | 43 |         | eLR                    | 14           | 01 | 03 |
|         | eLR (NNW)         | 16              | 54 | 23 |         | Aleutian Islands       |              |    |    |
|         | Kurile Islands    |                 |    |    |         |                        |              |    |    |
|         | USCGS 16 12 28.7  |                 |    |    | 20      | e                      | 17           | 20 | 48 |
|         | 44.2°N 148.0°E    | Dist. 87.4°     |    |    |         | e                      | 17           | 20 | 50 |
|         | Depth 51 km       | Mag 5 1/4       |    |    | 20      | eLR (SW)               | 20           | 19 | 03 |
|         | Z 1.5, E 2, N 2.5 |                 |    |    |         | Kermadec               |              |    |    |
| 19      | i                 | 17              | 18 | 38 | 20      | i                      | 21           | 08 | 04 |
| 19      | e                 | 17              | 51 | 38 |         |                        |              |    |    |
| 19      | e (P)             | 18              | 25 | 17 | 20      | eSKS                   | 22           | 04 | 09 |
|         | e                 | 18              | 43 | 03 |         | ePS                    | 22           | 07 | 09 |
|         | eLQ               | 18              | 45 | 23 |         | ePPS                   | 22           | 08 | 21 |
|         | eLR (NW)          | 18              | 49 | 53 |         | eSS                    | 22           | 13 | 11 |
|         |                   |                 |    |    |         | eLQ                    | 22           | 25 | 23 |
| 19      | eS                | 20              | 43 | 03 |         | eLR (NW)               | 22           | 29 | 23 |
|         | eSS               | 20              | 48 | 47 |         | South of Samoa Islands |              |    |    |
|         | eLQ               | 20              | 58 | 03 |         | USCGS 21 39 07.0       |              |    |    |
|         | eLR (NNW)         | 21              | 02 | 23 |         | 15.2°S 173.7°W         | Dist. 107.2° |    |    |
|         | Kurile Islands    |                 |    |    |         | Depth 25 km            | Mag 5 3/4-6  |    |    |
|         | USCGS 20 19 46.4  |                 |    |    |         | Z 4.5, E 8, N 3        |              |    |    |
|         | 44.6°N 150.2°E    | Dist. 85.7      |    |    | 20      | eLR (E)                | 23           | 47 | 03 |
|         | Depth 27 km       | Mag 5 1/4-5 1/2 |    |    | 21      | eLQ                    | 07           | 46 | 03 |
|         | Z 2.5, E 3, N 4   |                 |    |    |         | eLR                    | 07           | 55 | 03 |
| 19      | eSKS              | 22              | 31 | 03 | 21      | eLR                    | 14           | 51 | 03 |
|         | eLR (NW)          | 22              | 51 | 33 |         |                        |              |    |    |
|         | Kurile Islands    |                 |    |    | 21      | e                      | 18           | 56 | 26 |
|         | USCGS 22 07 51.2  |                 |    |    |         |                        |              |    |    |
|         | 44.9°N 149.5°E    | Dist. 85.7°     |    |    |         |                        |              |    |    |
|         | Depth 34 km       |                 |    |    |         |                        |              |    |    |

## Palisades, New York

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| Date    | Phase            | h  | m  | s               | Date    | Phase                 | h  | m  | s            |
|---------|------------------|----|----|-----------------|---------|-----------------------|----|----|--------------|
| Apr. 21 | ePPP             | 19 | 47 | 33              | Apr. 22 | eLR (S)               | 19 | 26 | 23           |
|         | e                | 20 | 03 | 33              |         | Near coast of Ecuador |    |    |              |
|         | eLR              | 20 | 10 | 23              |         | USCGS 19 01 34.4      |    |    |              |
|         | Kurile Islands   |    |    |                 |         | 2.8°S 80.8°W          |    |    | Dist. 44.3°  |
|         | USCGS 19 30 36.9 |    |    |                 |         | Depth 30 km           |    |    |              |
|         | 48.1°N 154.6°E   |    |    | Dist. 81.4°     |         |                       |    |    |              |
|         | Depth 23km       |    |    |                 |         |                       |    |    |              |
| 21      | e                | 20 | 37 | 03              | 22      | eLQ                   | 19 | 51 | 03           |
|         |                  |    |    |                 |         | eLR (NW)              | 19 | 58 | 33           |
|         |                  |    |    |                 |         | New Britain region    |    |    |              |
| 21      | eSS              | 20 | 39 | 19              |         |                       |    |    |              |
|         | eSSS             | 20 | 43 | 03              | 22      | e                     | 20 | 28 | 37           |
|         | eLQ              | 20 | 46 | 33              |         | e                     | 20 | 28 | 57           |
|         | eLR (NW)         | 20 | 51 | 03              |         |                       |    |    |              |
|         | Kurile Islands   |    |    |                 | 23      | eLR                   | 03 | 32 | 03           |
|         | USCGS 20 10 38.3 |    |    |                 |         |                       |    |    |              |
|         | 47.7°N 154.6°E   |    |    | Dist. 81.4°     | 23      | eSKS                  | 05 | 40 | 11           |
|         | Depth 27 km      |    |    |                 |         | ePPS                  | 05 | 44 | 57           |
|         | Z 3, E 4, N 3.5  |    |    |                 |         | eSS                   | 05 | 49 | 03           |
|         |                  |    |    |                 |         | eLQ                   | 05 | 59 | 43           |
| 21      | e                | 21 | 16 | 51              |         | eLR                   | 06 | 07 | 43           |
|         |                  |    |    |                 |         | Ryukyu Islands        |    |    |              |
| 21      | eP               | 21 | 37 | 19              |         | USCGS 05 14 31.1      |    |    |              |
|         | epP              | 21 | 37 | 33              |         | 26.2°N 129.8°E        |    |    | Dist. 109.7° |
|         | eS               | 21 | 45 | 57              |         | Depth 110 km          |    |    |              |
|         | ePS              | 21 | 46 | 09              |         |                       |    |    |              |
|         | eScS             | 21 | 46 | 59              | 23      | eP                    | 09 | 14 | 21           |
|         | eSS              | 21 | 50 | 23              |         | 8 sec 2.5 mic NNW     |    |    |              |
|         | eLQ              | 21 | 55 | 33              |         | ePP                   | 09 | 17 | 39           |
|         | eLR (NW)         | 22 | 00 | 33              |         | eS                    | 09 | 24 | 47           |
|         | Aleutian Islands |    |    |                 |         | ePPS                  | 09 | 25 | 43           |
|         | USCGS 21 26 42.1 |    |    |                 |         | eSS                   | 09 | 30 | 41           |
|         | 51.7°N 173.9°W   |    |    | Dist. 64.4°     |         | ePKKS                 | 09 | 34 | 55           |
|         | Depth 36 km      |    |    | Mag 5 1/4-5 1/2 |         | eSSS                  | 09 | 37 | 17           |
|         | Z 3, E 4, N 5    |    |    |                 |         | eLQ                   | 09 | 39 | 03           |
|         |                  |    |    |                 |         | eLR                   | 09 | 44 | 13           |
| 22      | e                | 01 | 08 | 33              |         | Kurile Islands        |    |    |              |
|         | e                | 01 | 11 | 03              |         | USCGS 09 01 41.8      |    |    |              |
|         | e                | 01 | 13 | 23              |         | 44.6°N 150.2°E        |    |    | Dist. 85.7°  |
|         | e                | 01 | 16 | 43              |         | Depth 44 km           |    |    | Mag 6 1/2    |
|         | eLQ              | 01 | 22 | 15              |         | Z 42, E 39, N 57.5    |    |    |              |
|         | eLR (NW)         | 01 | 29 | 03              |         |                       |    |    |              |
| 22      | eLR (SE)         | 02 | 20 | 33              | 23      | eLQ                   | 15 | 40 | 03           |
|         |                  |    |    |                 |         | eLR                   | 15 | 46 | 33           |
| 22      | e                | 17 | 01 | 51              |         |                       |    |    |              |
|         | e                | 17 | 01 | 56              | 23      | eS                    | 17 | 14 | 07           |
|         | e                | 17 | 02 | 31              |         | eSS                   | 17 | 19 | 53           |
|         |                  |    |    |                 |         | eLQ                   | 17 | 29 | 15           |
| 22      | e (P)            | 19 | 10 | 10              |         | eLR (NW)              | 17 | 35 | 03           |
|         | eS               | 19 | 16 | 31              |         | Kurile Islands        |    |    |              |
|         | eSS              | 19 | 19 | 37              |         | USCGS 16 51 03.6      |    |    |              |
|         | (continued)      |    |    |                 |         | 44.5°N 150.1°E        |    |    | Dist. 85.7°  |
|         |                  |    |    |                 |         | (continued)           |    |    |              |

| Date     | Phase             | h           | m  | s  | Date     | Phase            | h           | m  | s  |
|----------|-------------------|-------------|----|----|----------|------------------|-------------|----|----|
| Apr. 22  | Depth 76 km       |             |    |    | Apr. 25  | 32.7°S 178.5°W   |             |    |    |
| (cont'd) | Z 1.5, E 2, N 3   |             |    |    | (cont'd) | Depth 45km       |             |    |    |
|          |                   |             |    |    |          | Z 3.5, E 4, N 2  |             |    |    |
| 23       | eLR               | 21          | 35 | 43 |          |                  |             |    |    |
|          | Aleutian Islands  |             |    |    | 25       | e                | 16          | 23 | 46 |
| 24       | eLQ               | 05          | 22 | 33 | 25       | i                | 17          | 01 | 45 |
|          | eLR               | 05          | 29 | 03 |          |                  |             |    |    |
|          |                   |             |    |    | 25       | e                | 17          | 07 | 07 |
| 24       | eS                | 12          | 50 | 51 |          |                  |             |    |    |
|          | eSS               | 12          | 56 | 23 | 25       | i                | 18          | 37 | 35 |
|          | eLQ               | 13          | 11 | 43 |          |                  |             |    |    |
|          | eLR (NW)          | 13          | 17 | 43 | 25       | i                | 19          | 54 | 47 |
|          | Kurile Islands    |             |    |    |          |                  |             |    |    |
|          | USCGS 12 27 39.5  |             |    |    | 25       | i                | 20          | 37 | 45 |
|          | 44.5°N 150.2°E    | Dist. 85.7° |    |    |          |                  |             |    |    |
|          | Depth 76 km       |             |    |    | 26       | eLQ              | 07          | 15 | 03 |
|          |                   |             |    |    |          | eLR              | 07          | 22 | 33 |
| 25       | e                 | 00          | 52 | 03 |          | New Britain      |             |    |    |
|          | Kurile Islands    |             |    |    | 26       | eP               | 07          | 51 | 37 |
|          |                   |             |    |    |          | epP              | 07          | 52 | 03 |
| 25       | e                 | 01          | 10 | 03 |          | eS               | 08          | 02 | 03 |
|          | e                 | 01          | 13 | 03 |          | eSS              | 08          | 07 | 35 |
|          |                   |             |    |    |          | e                | 08          | 14 | 49 |
| 25       | eP                | 01          | 15 | 15 |          | eLQ              | 08          | 16 | 23 |
|          | e (S)             | 01          | 19 | 03 |          | eLR (NNW)        | 08          | 22 | 03 |
|          | eLR               | 01          | 24 | 03 |          | Kurile Islands   |             |    |    |
|          | Guatemala         |             |    |    |          | USCGS 07 38 54.1 |             |    |    |
|          | USCGS 01 09 16.2  |             |    |    |          | 44.6°N 149.9°E   | Dist. 85.7° |    |    |
|          | 14.4°N 90.1°W     | Dist. 30.4° |    |    |          | Depth 20 km      | Mag 5 3/4-6 |    |    |
|          | Depth 139 km      |             |    |    |          | Z 10, E 10, N 14 |             |    |    |
| 25       | eP                | 01          | 30 | 30 | 26       | e (PS)           | 19          | 56 | 02 |
|          | eS                | 01          | 40 | 43 |          | eLQ              | 20          | 11 | 42 |
|          | eSS               | 01          | 46 | 35 |          | eLR (NW)         | 20          | 16 | 02 |
|          | eLQ               | 01          | 55 | 03 |          | Kurile Islands   |             |    |    |
|          | eLR (NNW)         | 02          | 02 | 33 |          | USCGS 19 32 34.2 |             |    |    |
|          | Kurile Islands    |             |    |    |          | 44.6°N 150.1°E   | Dist. 85.7° |    |    |
|          | USCGS 01 17 42.7  |             |    |    |          | Depth 51 km      |             |    |    |
|          | 44.5°N 150.0°E    | Dist. 85.7° |    |    | 27       | eLR              | 00          | 25 | 02 |
|          | Depth 78 km       |             |    |    |          |                  |             |    |    |
|          | Z 3, E 3.5, N 4.5 |             |    |    | 27       | e (P)            | 18          | 02 | 22 |
| 25       | eSKS              | 11          | 42 | 31 |          | eS               | 18          | 09 | 12 |
|          | eSKKS             | 11          | 44 | 07 |          | eLQ              | 18          | 13 | 22 |
|          | eSS               | 11          | 53 | 55 |          | eLR              | 18          | 19 | 02 |
|          | eLQ               | 12          | 07 | 03 |          | Peru             |             |    |    |
|          | eLR               | 12          | 15 | 03 |          | USCGS 17 52 16.5 |             |    |    |
|          | Kermadec Islands  |             |    |    |          | 12.9°S 75.1°W    | Dist. 53.7° |    |    |
|          | USCGS 11 16 41.4° |             |    |    |          | Depth 124 km     |             |    |    |
|          | (continued)       |             |    |    |          |                  |             |    |    |



| Palisades, New York |                         |                 |    | 31 |         |                               | 1961            |    |    |
|---------------------|-------------------------|-----------------|----|----|---------|-------------------------------|-----------------|----|----|
| Date                | Phase                   | h               | m  | s  | Date    | Phase                         | h               | m  | s  |
| Apr. 28             | eLQ                     | 01              | 20 | 02 | Apr. 30 | e                             | 04              | 59 | 11 |
|                     | eLR                     | 01              | 25 | 02 |         | eLQ                           | 05              | 04 | 21 |
|                     | Monterey Co., Calif.    |                 |    |    |         | eLR                           | 05              | 05 | 31 |
|                     | USCGS 01 02 52.2        |                 |    |    |         |                               |                 |    |    |
|                     | 36.3°N 121.6°W          | Dist. 37.6°     |    |    | 30      | eLQ                           | 05              | 28 | 31 |
|                     | Depth 41 km             |                 |    |    |         | eLR                           | 05              | 33 | 01 |
| 28                  | eLR                     | 06              | 47 | 02 | 30      | eP                            | 07              | 40 | 21 |
|                     |                         |                 |    |    |         | eS                            | 07              | 45 | 19 |
| 28                  | eLQ                     | 07              | 35 | 42 |         | eLQ                           | 07              | 46 | 01 |
|                     | eLR                     | 07              | 38 | 02 |         | eLR (NE)                      | 07              | 48 | 01 |
| 28                  | eL                      | 09              | 09 | 02 |         | North Atlantic Ocean          |                 |    |    |
|                     | South Bolivia           |                 |    |    |         | USCGS 07 33 53.5              |                 |    |    |
|                     |                         |                 |    |    |         | 52.0°N 31.9°W                 | Dist. 30.4°     |    |    |
| 28                  | eLQ                     | 14              | 18 | 02 |         | Depth 38 km                   | Mag 5           |    |    |
|                     | eLR                     | 14              | 22 | 22 |         | Z 11, E 14, N 10              |                 |    |    |
| 28                  | e                       | 20              | 57 | 22 | 30      | eP                            | 11              | 28 | 11 |
|                     | e                       | 20              | 57 | 34 |         | eS                            | 11              | 38 | 27 |
| 29                  | eLR                     | 00              | 14 | 41 |         | eSS                           | 11              | 44 | 21 |
|                     |                         |                 |    |    |         | eLQ                           | 11              | 51 | 11 |
| 29                  | eLQ                     | 06              | 42 | 01 |         | eLR (NW)                      | 11              | 57 | 01 |
|                     | eLR                     | 06              | 47 | 01 |         | Kurile Islands                |                 |    |    |
| 29                  | eP                      | 09              | 27 | 06 |         | USCGS 11 15 19.8              |                 |    |    |
|                     | epP                     | 09              | 27 | 14 |         | 44.6°N 149.7°E                | Dist. 85.7°     |    |    |
|                     | ePP                     | 09              | 28 | 37 |         | Depth 70 km                   | Mag 5 1/2-5 3/4 |    |    |
|                     | eS                      | 09              | 33 | 11 |         | Z 7.5, E 5, N 8               |                 |    |    |
|                     | eSS                     | 09              | 36 | 29 | 30      | e                             | 14              | 27 | 45 |
|                     | eLR (WNW)               | 09              | 39 | 31 |         | eLR (NW)                      | 14              | 34 | 01 |
|                     | (Rg)                    | 09              | 43 | 51 | 30      | eSKKS                         | 15              | 13 | 45 |
|                     | Off coast N. California |                 |    |    |         | ePS                           | 15              | 16 | 39 |
|                     | USCGS 09 19 28.3        |                 |    |    |         | ePPS                          | 15              | 17 | 27 |
|                     | 40.6°N 127.5°W          | Dist. 40.2°     |    |    |         | eSS                           | 15              | 22 | 27 |
|                     | Depth 26 km             | Mag 5 1/2-5 3/4 |    |    |         | e (SSS)                       | 15              | 30 | 21 |
|                     | Z 23, E 23, N 27        |                 |    |    |         | eLQ                           | 15              | 33 | 01 |
| 29                  | eLQ                     | 09              | 47 | 01 |         | eLR (WNW)                     | 15              | 39 | 01 |
|                     | eLR (NE)                | 09              | 51 | 01 |         | Samoa Islands region          |                 |    |    |
|                     | USCGS 09 29 09.5        |                 |    |    |         | USCGS 14 48 11.5              |                 |    |    |
|                     | 71.3°N 7.4°W            | Dist. 44.4°     |    |    |         | 15.3°S 174.4°W                | Dist. 107.2°    |    |    |
|                     | Depth 14 km             | Mag 5 1/2-5 3/4 |    |    |         | Depth 25 km                   | Mag 5 3/4-6     |    |    |
|                     | Z 10.5, E 20, N 20      |                 |    |    |         | Z 6, E 7, N 4                 |                 |    |    |
|                     | Jan Mayen Island region |                 |    |    | 30      | e                             | 16              | 29 | 03 |
| 29                  | eLQ                     | 17              | 12 | 21 | 30      | eS                            | 17              | 44 | 27 |
|                     | eLR                     | 17              | 16 | 01 |         | eLR (NW)                      | 17              | 49 | 01 |
| 30                  | eLQ                     | 01              | 29 | 21 |         | Off coast northern California |                 |    |    |
|                     | eLR                     | 01              | 35 | 31 |         | USCGS 17 30 38.6              |                 |    |    |
|                     |                         |                 |    |    |         | (continued)                   |                 |    |    |



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1961

Palisades, New York

| Date     | Phase          | h | m | s |
|----------|----------------|---|---|---|
| Apr. 30  | 40.7°N 127.2°W |   |   |   |
| (cont'd) | Depth 44 km    |   |   |   |

Dist. 40.2°

30 eLR (NW) 18 55 01

30 eL 22 38 41

357.

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